Pests

AND THEIR CONTROL

1942
JULY
VOL. 10 NO. 7

ORGAN OF THE PEST CONTROL INDUSTRY

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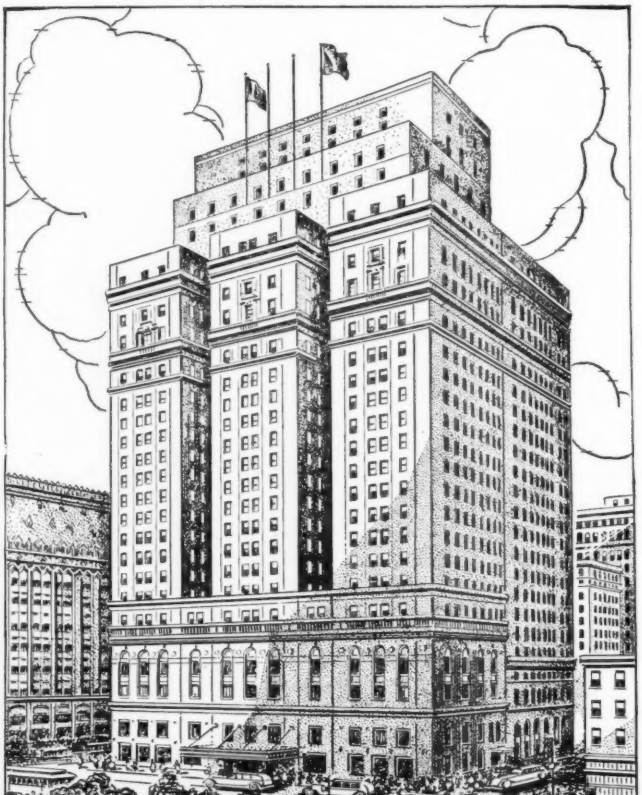

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October 26th to 28th, 1942

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Pests

and Their CONTROL

COOPERATING WITH NATIONAL PEST CONTROL ASSOCIATION

Exterminators, Fumigators, Termite Control Operators, Entomologists, Insecticide and Supply Manufacturers

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"Contributed articles in this publication do not necessarily reflect the opinions of the editors. The editors invite discussions, comments and all types of literary material pertaining to pest control and pests from any person interested in the advancement of the field."

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EDITORIAL

Nation-Wide Survey Ranks Structural Pest Control High As War Need

IF EXPERT testimony were needed to underline the indispensability of the PCO in the total war effort, it is abundantly supplied in the sheaf of eighty or more letters received by the National Pest Control Association from public health and other government officials, medicos, plants engaged in war production, flour mills, food packers, hospital superintendents, real estate concerns, etc., quotes of which, for the most part, appear in Service Letter No. 249. Typical amongst those appearing therein are quoted below. They bespeak, better than anything we can say, the concurrent need for the War Production Board to grant the PCO priority protection on the chemicals he uses in the control of household and structural pests, on a par with—or something akin to—that extended users of these same chemicals in the control of agricultural pests.

From Dr. P. N. Annand, Chief of Bureau of Entomology and Plant Quarantine, Washington:

> . . . Various kinds of well known insect pests cause material losses to food supplies and some of them are known to transmit diseases to man and animals. . . . The control of these pests is important to conserve food supplies, protect the health of people engaged in the war effort, and to avoid annoyances which reduce efficiency.
>
> The pest control operators frequently contribute materially to efforts directed toward the control of these pests. . . . The exact relation that pest control operators may have to the war effor will differ under various conditions. It is not practicable, therefore, to make an appraisal of the specific relation of each pest control operator or each specific job to the war effort without considering many factors, including local conditions and the places where control operations are applied. It may be said, however, that in general the work of pest control operators has an important place in the conservation of supplies, protecting health, and promoting efficiency. . . .

From the Commissioner of Health of a Large City in Wisconsin:

> The control of pests is always of importance as a measure contributing to the public health of the community. The importance of such control is not mitigated during the war time but it rather assumes an importance even greater than during normal times. The control of rats, mice, cockroaches, bedbugs and other pests is not only of great importance in the protection of public health, but is also of extreme importance from an economic viewpoint.
>
> . . . In my opinion everything consistent with the war effort should be done to keep pest exterminating establishments operating during the war, so that our health and economic security may be enhanced.

From the Superintendent of Schools of a Michigan City:

> In my opinion the Pest Control Industry should be entitled to a priority rating because if rodents, food and fabric destroying insects should become too numerous it would tend to decrease not only the health standards of a community or military camps but also react upon the morale of the people. It seems to me that the health of the people producing ammunition of war and the physical fitness of the next generation are of utmost importance.

From a Physician of Hazel Park, Mich.:

> With this sudden swamping rush of migratory workers in defense plants, and the attendant overloading of housing facilities, a great increase in insect born diseases would be possible, as well as rodents and other pests.

From a Connecticut City:

> I am glad to testify to my feeling that the matter of pest control in our building, housing well over one hundred workers in defense industries of this city is very important to public health, which, of course, is necessary to National Defense.

From a Large Milling Company of Minneapolis:

> It is very necessary that chemicals for fumigating flour mills are furnished to fumigation companies and to flour mills so that the standard set by most mills in eliminating insects can be maintained. To properly keep a flour mill free from weevils and other insects that are found in wheat and flour it is necessary to have a thorough fumigation of the mill two or three times per year. If no chemicals are furnished for this purpose, it means that it will be impossible for any mill to be sure of controlling the pests that are found in flour and wheat. We try to keep our mills as clean as possible all during the year but find it necessary to fumigate every one of our mills two or three times in order to control these pests.

From a Woolen Plant:

> We wish to report that since the latter part of 1941 we have been operating entirely on defense contracts from the U. S. Army, Marine Corps, and Maritime Commission. We operate 24 hours a day, 6 days a week. We consider the health of our employees and the sanitation of the plant more important than ever before.
>
> We have a pest control contract with XYZ Corporation, who has served us for years. We consider this service an absolutely essential part of plant protection and hope that there is no question about such companies being able to continue to get the chemicals they need.

▸▸▸ One "date" you can't afford not to keep is with your fellow operators at the forthcoming N.P.C.A. Convention in October. Convention Headquarters, William Penn Hotel, Pittsburgh. ◂◂◂

Where Warranted, Voluntary Price Reduction Effective Good-Will Builder

WHO, amongst us, hasn't at one time or other been exposed to the beguiling influence of such good-will sales stimulants as bingo, bank-nite and the like?

In marked contrast, and because it stems straight from the sound business philosophy that it is not only necessary to inspire customer confidence, but also not to abuse that confidence, an Industry good-will builder comes to light that possesses dignity, and in a manner of speaking, a "statesmanlike" quality as well. Referred to in this instance is the PCO who, in the circumstance of revised costs, voluntarily instituted price reductions for certain of his clients even though they were not questioning the agreed-upon prices, valid, of course, at the time the business was placed. That anything of this nature has been attempted, hitherto, we are not aware. It is further evidence—though none is needed—of the PCOs business ability and integrity.

Not unmindful of the fact that memories are sometimes short, ungratefulness not uncommon, nevertheless, we are sure, his agreeably startled clients are not going to easily forget the unusualness of his good-will gesture. There is not much question that he has placed these accounts in a "competitive-doldrum" which even the strongest winds of lower-bidder competition are not likely to dissipate. His broad-visioned policy is in keeping with, and should make its contribution to, the Government's program of inflation-control; moreover, it should prove a noteworthy ambassador of good will for the Industry in more places than one.

And now, may we "reverse our field" of thinking for the moment and emphasize that prices made to meet hearsay prices of competitors, or those John Q. Public hints he has been offered, rather than on a stick-tight policy of a fair price for an efficient job of pest control, are apt to forge a double-edged sword, one side cutting into profits and the other into respect for the Industry.

So far as profits on business-at-any-price are concerned, where the PCOs "scientific conscience" won't permit him to stint on the essentials of service time, chemicals and other ingredients, there is not likely to be any. But, if, as is more likely, in order to make both ends meet, he cuts corners to equalize fixed costs, the unsatisfactory results will assuredly promote lack of respect for the Industry.

It is clear, then, we think, that there is not much to be gained by jumping over the realities of fixed costs, profits and respect for the Industry, only to land kerplunk into the midst of the unrealities of profit-less business and Industry disrespect.

Selective Service and the Pest Control Industry

BLANKET draft exemptions for members of the Pest Control Industry on the grounds of their indispensability as a contributive factor in maintaining public health, preservation of food stuffs and other property, as National Pest Control Association Service Letter No. 248 makes clear, is extremely unlikely; though it adds "that with proper approach Local Boards must view individual cases of severe handicap by extending a reasonable exemption period (for employees) until some kind of adjustment is made whereby another individual can be trained to do the type of work."

The essentiality of the Industry is not in question, but, as we understand it, and as the American Journal of Public Health sums up the situation for its own field, which at many points intervolves that of pest control: "As the strategy and economy of war develops, all local personal, and group interests must give way to National needs . . . Public health administrators are adjusting to meet the new demands. As the situation becomes more sharply defined, two things stand out clearly: The first is that the military services must have prior claim on public health's tough and active workers, and the second, that the problem which administrators in this field face is not to preserve public health organizations and staffs as they were, but to maintain the public health in spite of inadequacy in personnel. And they will do this. Public health officers are not themselves so far spent they are unable to stoop and rebuild, even though it must be done with untempered and sometimes worn tools."

Of collateral interest is the report reprinted from the Chicago Tribune, in N. P. C. A. Service Letter 245, which lists 22 types of workers officially reserved from draft in England, with reservation age of each, and which includes: mole catcher, rabbit catcher, rat catcher—30 years of age. It is reasonable to surmise, we think, that the exemption indicated was motivated, in part, by the inordinate pest problems set in motion as a result of the terrible bombings sustained by English cities and towns, particularly in their working class districts. That situation, fortunately, does not obtain here yet.

The Association has indicated it hopes soon to make available other interpretations with respect to the Selective Service Act and their relation to the PCO, all of whom, as was abundantly manifested even before "Pearl Harbor," and since, stand ready, whenever and wherever called upon, for service on either the war or civilian fronts.

★ ★ Buy Defense Bonds ★ ★

Antidotes, II, Layman's Antidotes

By JAMES C. MUNCH, *Consulting Pharmacologist, Fish & Wildlife Service, U. S. Dept. of the Interior, Lansdowne, Penna.*

EDITOR'S NOTE: (*Speech delivered before joint Meeting of New York Pest Control Association and Professional Exterminators Association, at Hotel Commodore, New York City, on March* 10, 1942).

POISONS are recognized as harmful substances, but great difficulty is encountered in attempting to develop a legally adequate, precise definition. From a detailed study of this question presented before another Association in 1939, I proposed the following draft:

"A poison is a substance which chemically reacts with normal living tissues, with the usual effect of injuring health or destroying life." This gives consideration to the nature of the poisonous thing, of the effect, of the recipient, and of the response, but does not attempt to fix the quantity. As a matter of administrative convenience, or preciseness, various groups attempt to define a poison as a substance causing death after the administration of some arbitrary quantity which may range from less than 1 gram to more than 50 grams.

The particular field of science interested in poisons, their effects and their detection, is known as "Toxicology." This science deals with the study of solids, liquids and gases, which may be inhaled, swallowed, injected, applied, or otherwise brought in contact with living tissues. The use of various poisons has been traced back several thousand years. In testing the actions of new plants or minerals on mankind or on animals, preparations were classified as inert material, foods and poisons. The action of various suspected poisons was tested on criminals, to confirm the opinion of the ruling classes, and to determine better methods of administration. This also gave opportunity for the study of the various "theriaca," especially by such students as Mithridates. The first text in this field was that of Orfila in 1814. The next authentic text, and the first in English, is Robert Christison's A Treatise on Poisons published in Edinburgh in 1829. During the twentieth century a number of text have appeared in this field, such as those by Autenrieth, Blyth, Davison, Jacobs, Leschke, McNally and Peterson, Haines and Webster. Toxicology is now considered as a branch of pharmacology, and the poisonous effects of various drugs considered in connection with their pharmacodynamic actions in texts such as those by Cushny, Clark, Gaddum, McGuigan and Sollmann.

Drugs exert effects on practically all tissues of the body. However their chief effects, earliest or greatest responses may be localized to one or to a few tissues and to this extent it is permissable to consider the locus of predominant action of a drug or a poison. A poison has been described as "too much". Any substance may be poisonous under certain conditions; this includes water, salt, sugar, baking soda, in addition to the products commonly recognized as "poisons". It is necessary that certain precautions be developed for handling substances which may be poisonous, and regulations developed to supplement common sense in this matter. A substantial part of the training of pharmacists deals with the question of the proper handling and distribution of poisons for industrial use, or on physician's prescriptions.

Special pains should be taken in handling any poisonous substance; familiarity based on continued use should not lead to contempt for harmful effects and thus to carelessness in handling poisons. This is best accomplished by proper training of individuals and groups, such as those comprising your associations, so that you will appreciate the dangers, and the proper steps to prevent poisons reaching untrained, ignorant, or irresponsible laymen. Some training program and some type of text book to help you develop the safest and most efficient uses for poisons used in your activities are required. Studies which have been and are being made by the Fish and Wildlife Service on a laboratory and a field scale are intended to develop specific poisons, specific methods of use, specific knowledge of the dangers associated with such use by properly trained personnel, and proper methods of overcoming or antidoting toxicity. After results have been obtained in the laboratory and on a small scale, such information is supplemented by that which your groups obtain from your usage on a field scale, and these two types of study are mutually advantageous. Poisons used for rodent control have developed from such studies.

Prevention of poisoning is definitely better than cure; three steps should be considered in this connection: (1) Keep the poison from the patient; (2) Get the poison from the patient (3) Restore the patient to normal, if possible. Step (1) is a matter of proper handling. Step (3) calls for action by the physician and should be undertaken by a layman only under those conditions under which a physician cannot be obtained. Proper treatment of poisoning may call for intravenous injections of other poisons which must not be undertaken except by properly trained individuals. The antidotes may be dangerous unless given in proper doses, at proper intervals, and by proper methods, all of which are beyond the training of the layman. Therefore all lists of antidotes on poisons specify "Send for a physician at once". Since many poisons are uncommon and have industrial or rodenticidal use but no general therapeutic applications, even physicians may not be acquainted with antidotes for some of the poisons used. Consequently laboratory studies are made on old and new poisons in an attempt to develop methods for antidotal procedure. The first paper on this series (6) dealt with the general plan of laboratory and literature studies of various poisons for man and other animals and the desire to study the value of various methods of using products as antidotes. The third paper (5) reported studies on a method of treatment of thallo-toxicosis in the laboratory, which was subsequently used on humans in California (3, 4,). It should be recognized that these studies are still in progress, chiefly in the Research Laboratory of the Service in Denver; also that no guarantee is made that these suggested antidotes will be completely successful; however these studies have lead to certain steps which are believed to be helpful in the hands of the layman, before the doctor comes, and they will not do any harm to the patient under the conditions recommended or suggested for use. The purpose of laymen's antidotes is to separate as much poison from the

patient as possible, to do as little damage to the patient as possible and to assist the physician in sofar as may be feasible. The general treatment which may be safely used by the layman in most instances consists in washing out the stomach or otherwise emptying it to remove as much as possible of the poison still present in the stomach; then to administer safe doses of safe drugs to counteract the local effects (and to a limited extent, the systemic action) of the poison. For this purpose dilution with water is the simplest process if the poison is external or is still in the stomach and has not caused any marked reaction with the tissues.

A "universal antidote" has been developed which has proven helpful in endeavoring to combat many types of poison, especially where the nature of the poison is unknown (1). This consists of a mixture of two parts of activated charcoal with one part each of tannic acid, of kallin (Fuller's Earth), and of light magnesium oxide. A heaping teaspoonful of this powder is stirred into one-half to one glass of water and swallowed; after leaving it in the stomach for several minutes it is washed out or vomited up, and a second dose given which may be left in the stomach. This combination is to neutralize acids or alkalies, and to absorb or chemically react with many poisons. In the quantity indicated it should not cause any harmful effect.

In connection with scientific methods for rodent control and insecticidal work a comparatively small number of poisons have been developed for most general uses. These poisons and simple methods of antidotal protection against them have been studied to develop a series of individual antidote kits which will be available, complete, safe, stable, and simple to use. At this time kits are available against arsenic, barrium carbonate, phosphorous, strychnine and thallium. Consideration is being given to antidote kits against other types of poisons but have not reached the stage permitting any proposals at this time. As our studies progress to the stage where a kit can be suggested, it will be reported in a subsequent paper of this series. The ingredients comprising each of these antidote kits is shown in Table 1. Full directions for use are given on the circular accompanying each kit, and also on each envelope containing the suggested product within each kit. The quantities of the ingredients suggested were selected, based on general information, and may require modifications under some conditions. Therefore, the quantities are not included in the Table.

(1) **Arsenic Antidote Kit:** "Arsenic" chemically is arsenious acid (As_2O_3); it has been used for many years in insecticides, sprays and dips, as well as in rat poisons. The Borgia's attained notoriety about 1500 by their ability to use arsenic to remove obstacles from their paths . . . their success in poisoning rivals for the highest honors of the church led to the statement that many individuals who were invited to a Borgia Banquet "went in as guests and came out as ghosts." Morgagni reports a case of arsenic poisoning following the accidental addition of an arsenic-cheese bait prepared to kill rats to food more than a century ago (2). A mass poisoning by arsenical beer, due to the use of arsenical glucose occurred in Lancashire and the Midland Counties of England in 1890, affecting more than 5,000 consumers. Analysis of the beer showed the presence of 0.01 grain of arsenic per pint, or 1.4 parts per million. From the information obtained in this outbreak, the World tolerance for arsenic in foods was established at this level. Arsenic poisoning causes vomiting, diarrhea, pigmentation of the skin, sudden weakness and collapse. The fatal dose for rats, when mixed in baits is about 100 mg/kg, of very fine powdered arsenic, or of solutions containing arsenic. The fatal dose for adults is reported to fall between 1.5 and 3 mg/kg, or about 200 mg in all for an adult. The treatment consists of mustard as an emetic, followed by albumin as a protective.

(2) **Barium Carbonate Antidote Kit:** Barium carbonate has been used rather extensively, not because of its efficiency, as because of its availability. Barium compounds, if soluble, stimulate all muscles, causing vomiting, colic, violent diarrhea, and damage to the heart muscle which leads to death. The fatal dose for rats, when mixed in baits, is about 750 mg/kg. The fatal dose for adults is about 800 mg/kg, or between 4 and 40 grams in all, depending on the type of barium compound administered. The treatment consists of mustard as an emetic, followed by magnesium sulfate to counteract the barium action, to form the relatively insoluble sulfate, and to act as a purgative.

(3) **Phosphorus Antidote Kit:** Yellow phosphorus was formerly used in the manufacture of matches but was so poisonous that laws were passed prohibiting such use. Combinations of phosphorus, such as zinc phosphide have been used, which appear to resemble phosphorus in toxicological action. Phosphorus dissolves in the fats and bile in the body and is rather rapidly absorbed. It causes irritation of the gastro intestinal tracts with vomiting and purging, but all of these symptoms are transitory, if the individual survives for six hours or so. Secondary symptoms of poisoning, such as fatty degeneration of the liver develop after two to three days, which may lead to death. Accidental contamination of foods with phosphorus baits for rats or for cockroaches may lead to death. The fatal dose of phosphorus has not been definitely determined, but is probably between 1 and 2 mg/kg; for adults this would mean a total dose of 50 to 100 mg. The toxicity of zinc phosphide has not been reported for humans; restricted studies on a laboratory basis have suggested that the lethal dose for rats, in a bait, is about 25 mg/kg. The treatment consists of mustard to cause vomiting, potassium permanganate to oxidize the phosphorus to harmless phosphates, copper sulfate

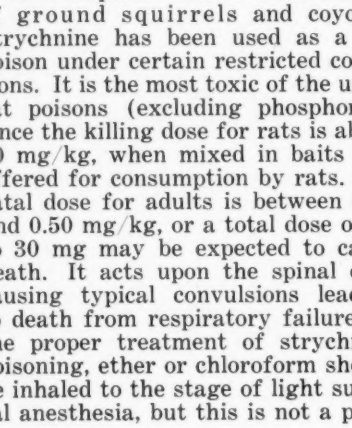
COMPONENTS OF ANTIDOTE KITS

Envelope No.	Arsenic	Barium Carbonate	Phosphorus	Strychnine: Human	Strychnine: Dog	Horse	Thallium
1	Mustard	Mustard	Mustard	Mustard	Mustard	Potassium Permanganate	Mustard
2	Egg Albumin	Powdered Magnesium Sulfate	Potassium Permanganate	Sodium Amytal	Sodium Amytal	Oil Sodium Iodide	
3			Copper Sulfate	Tannic Acid Charcoal	Potassium Permanganate	Bismuth Subgallate	
4				Magnesium Sulfate	Oil	Oil	Milk

to form an insoluble copper salt and to stop absorption from the gastro-intestinal tract, and magnesium sulfate as a purgative.

(4) **Strychnine Antidote Kits:** Strychnine has been used for almost a century in the control of predatory animals in the United States, chiefly West of the Mississippi River. During the gold rush of 1849 in California, a boat load of drugs consisting chiefly of strychnine and quinine was shipped from Philadelphia around the Horn to California. The strychnine in this shipment was for the killing of ground squirrels and coyotes. Strychnine has been used as a rat poison under certain restricted conditions. It is the most toxic of the usual rat poisons (excluding phosphorus) since the killing dose for rats is about 10 mg/kg, when mixed in baits and offered for consumption by rats. The fatal dose for adults is between 0.25 and 0.50 mg/kg, or a total dose of 16 to 30 mg may be expected to cause death. It acts upon the spinal cord causing typical convulsions leading to death from respiratory failure. In the proper treatment of strychnine poisoning, ether or chloroform should be inhaled to the stage of light surgical anesthesia, but this is not a practice which can be entrusted to a layman. If convulsions have developed, or if excessive nervousness shows that convulsions are about to develop, it is necessary that surgical anesthesia be induced to save the life of the victim. Three types of kits have been developed for use by the layman in an attempt to be helpful, if antidotal treatment can be started before convulsions develop. (A) For humans consists of mustard as an emetic, sodium amytal capsules as a sedative, tannic acid and charcoal tablets to react with and to absorb any extra strychnine; cream or warm lard to decrease absorption from the gastro-intestinal tract. (B) For dogs consists of mustard with the hope that it will cause emesis, sodium amytal, potassium permanganate to oxidize any strychnine in the stomach; this may be followed by cream, lard or other animal fat. (C) For horses consists of cleaning out any grain from the horses mouth, then potassium permanganate as a drench, followed by lard.

(5) **Thallium Antidote Kit:** Thallium sulfate has been used in Germany and in the United States for the control of rats and mice, and in the United States for the control of ground squirrels. Because of its toxicity it is not extensively used in human medicine at this time, although it was the basis of several commercial depilatories, such as "Kornmlu". Large doses of thallium salts cause hemorrhagic gastritis, with respiratory failure; smaller doses cause disturbances of the nervous system, encephalopathy, emesis and nephritis, and death from central respiratory failure. Since the general practitioner is not apt to be familiar with the treatment of thallium poisoning, it is outlined in a circular accompanying this kit. The treatment is rather complicated; it is based on laboratory studies, and on the methods used in an outbreak of thallium in California (3, 4, 5). The fatal dose of thallium sulfate, in baits for rats, is 25 mg/kg for rats. For humans over 12 years of age, 4 mg/kg is dangerous and deaths have been reported from somewhat larger quantities; 8 mg/kg might be fatal, which would correspond to a fatal dose of 400 mg. for an adult. The treatment consists of mustard as an emetic, sodium iodide in an attempt to convert thallium into the insoluble iodide, and bismuth subgallate to delay absorption from the gastro-intestinal tract.



Introducing . . .

Antidote KITS

for Commercial Use

A series of antidote kits are now available for PCOs, based on the findings of one of this country's leading toxicologists. His study of the actions of various poisons used by pest controllers and exterminators has led to the preparation of antidote kits to be used as a first aid measure in cases of accidental poisoning.

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By the use of the procedures outlined in connection with these individual antidote kits, it is hoped that the symptoms of poisoning may be prevented and, in some instances at least, that sufficient poison may be inactivated and removed from the body to be of material assistance in counteracting the harmful effects of the product taken. The use of these antidote kits is similar to the use of artificial respiration as a first aid measure in drowning; the treatment **should not injure** the patient, and it may **help** to save his life. It is believed that the use of these kits will make the field use of these poisons a safer procedure. Workers who are **properly** trained in the methods of preparation and distribution of poisons should also be trained in the use of these laymen's antidote kits.

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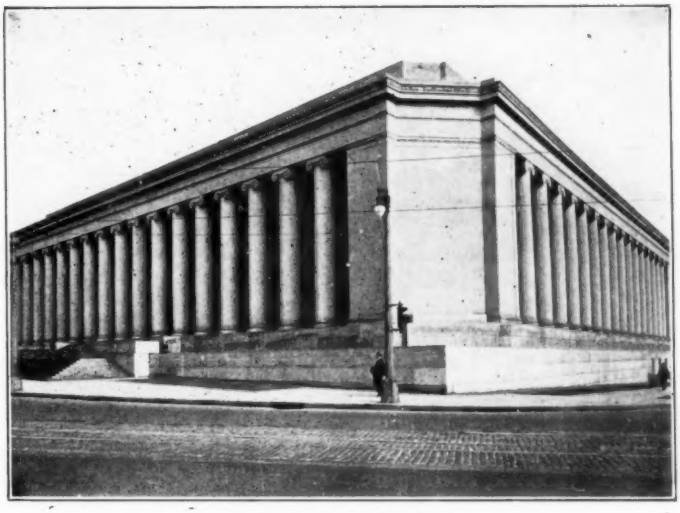
Pest Control?

Tulip fanciers in Suburbia report gray-squirrel atrocities as being uncommonly severe this month. One unfortunate has lost twenty Clara Butts and sixteen Mr. Farncombe Sanderses out of a bed of fifty; the playful rodents pull down the tallest and handsomest, nip off the flower heads and devour the honey-laden pistils. Garden clubs debate whether to give up tulips as a hopeless job, or to get in dutch with the game warden by doing away with the squirrels. There is, however, a third way out. That is to appease the squirrels by planting more and more tulips, and still more. A squirrel's appetite for honey has its limits, after all.

Do You Know

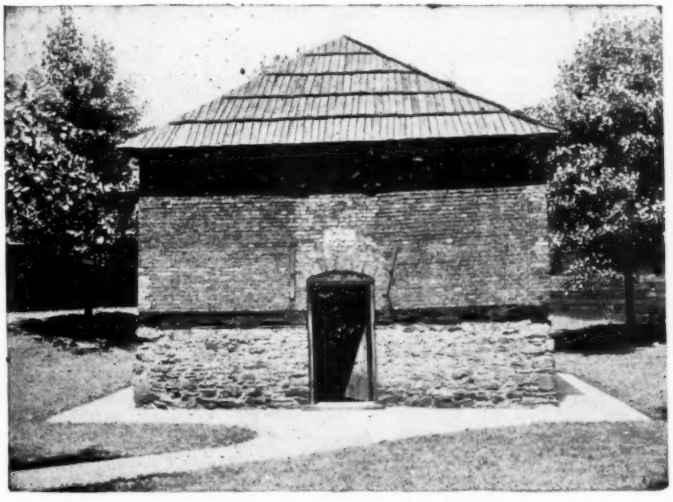
Americans pay about $60,000 a week in fines for driving while intoxicated?

PITTSBURGH, PA. — N.P.C.A. Convention City — Oct. 26-28



MELLON INSTITUTE

Known as the "Laboratory of the World" the new building of Mellon Institute was completed and dedicated early in 1937. Without discussing the tremendous scientific achievements which have and will emerge from this institution, the building itself is worthy of the attention of every visitor to Pittsburgh. A pure Ionic structure, 300 feet square, it boasts of 62 Monolithic columns, the shafts of which weigh 60 tons apiece. These are reputed to be among the largest one piece columns in the world. The building contains nine floors, four of which are devoted to Chemical Laboratories, several to Research Laboratories for other scientific classifications, lecture rooms, offices, library and museum, etc. Here will gather the scientists of the world in search of information to ease man's burden.



FORT PITT BLOCK HOUSE

Historic Block House, which is all that is left of Fort Pitt, constructed in 1759, close to the site of the ruins of Fort Duquesne, built in 1754 by the French and burned by them on approach of George Washington and his Colonial troops from Virginia, a part of General Forbes' Army who drove the French out of this section in September, 1758.

This historic building is open to visitors without charge, and in view of its significance as the outpost of the White Man in his settlement of Ohio, Indiana and Kentucky, is of especial interest to all. It is located at the Point of the Golden Triangle, in the very heart of the business district.

SPIDER BEETLES*

By **H. E. GRAY**, *Division of Entomology, Department of Agriculture, Ottawa*

MOST stored product insects are very partial to warm comfortable quarters in which to feed and conduct their family affairs. Such is not the case with the spider beetles. These hardy denizens of the north contradict many of the generalizations made concerning the better-known pests which contaminate cereal products. Fully able to survive the rigors of a Canadian winter they appear with the first few warm days of spring ready for the season's activities. While reported at times in northern United States they are of much more economic importance in various sections of Canada.

The common name of the group is derived from the resemblance of the adults of certain species to a small spider. One small, shiny, globular beetle, **Mezium affine** Boiel. often found in basements looks very much like a small spider.

Many of the spider beetles now found in North America have apparently come from other parts of the world as a result of international trade. Once introduced, local commerce soon spreads them extensively.

Spider beetles are primarily warehouse pests of cereal products and only invade mills when the premises are used for storage as well as production. The heaviest infestations are likely to be found in slow selling lines which remain in storage for a long time. The materials attacked by spider beetles include all milling company products, as well as various seeds and certain whole grains, i.e. wheat, barley, rye and flax. The most serious infestations have been in flour and in feeds such as bran and shorts and various meal preparations.

Adult of the hairy spider beetle, **Ptinus villiger** Reit., (greatly enlarged).

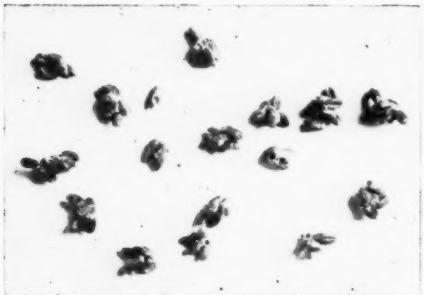
(After Gibson and Twinn, Bull. 112, Department of Agriculture, Ottawa.)

In addition to the actual damage and loss caused by the insects in the infestation of human food products there is the physical sensitivity of the customer to contamination of any kind in such products. An accumulation of silk and granular material as well as some frass is usually present in sacks of flour infested by spider beetles. There is not, however, the discoloration nor apparently the degradation of elasticity and viscosity of the flour as in the case of serious infestations of the confused flour beetle. The public has been educated to regard all foreign matter in food with great suspicion and to satisfy his customers the manufacturer must supply products which are free from insect pests. While the public may not complain to the manufacturer about the infested material they do purchase other brands of the commodity in place of the one in which they found the infested material.

Description of the Stages

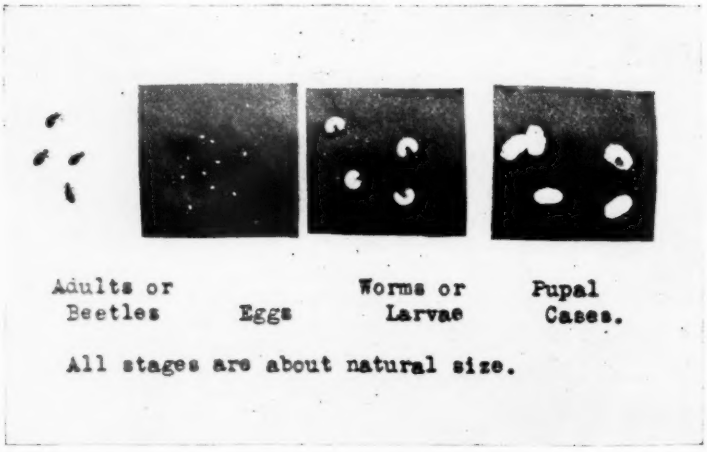
In size the beetles vary from a little less to more than an 1/8 of an inch in length, are more or less spider-like in form, varying in colour from light to dark-brown, many of the species having 4 irregular white patches on the wing covers. While able to crawl

*Publication No. 214, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Canada.



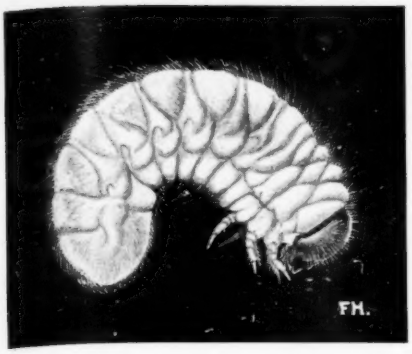
Kernels of wheat fastened together by the larvae of the hairy spider beetle. The larva feeds inside the group of kernels.

(After Gray, Proceedings of the World's Grain Exhibition and Conference, Vol. 2, Canada, 1933.)



The various stages of the hairy spider beetle, **Ptinus villiger** Reit.

After Gray in the Hairy Spider Beetle in Western Canada, A Warehouse Pest. Pamphlet distributed by the Western Millers' Association, Winnipeg, Man., May 1, 1933.



Larva of the hairy spider beetle, **Ptinus villiger** Reit., (greatly enlarged).

(Photograph of an original drawing, courtesy Division of Entomology, Department of Agriculture, Ottawa.)

rapidly they frequently feign death. When active the antennae are carried in a widely separated position.

The eggs are about 1/40 of an inch in length with a pearly tint but the usual covering of flour masks the true dimensions and appearance.

The general body colour of the larva is creamy white, the head and mouth parts being of a brownish tint. The body is covered with hairs to which particles of food frequently adhere. The little worm lies on its side in a curved position and resembles a small edition of a "white grub." Full grown larvae are about 1/6 of an inch in length.

After completion of the larval development, a pupa, pearly-white at first and later reddish-brown in colour, is formed within a pupal cell.

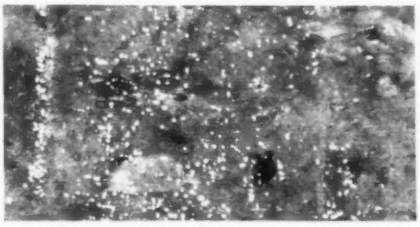
Seasonal History

The beetles appear with the first warm days in spring, and are usually present until about July 1. Mating occurs and the eggs are laid in or on the bags of cereal products. The eggs hatch in about 2 weeks and the larvae require approximately 3 months to complete their growth. Pupal cases are formed and the change to the adult stage takes place within this protecting structure. Under the most favourable conditions the time from the egg to the adult is from 3½ to 4 months. Some adults are frequently found in the warehouses during the early autumn but such individuals apparently do not lay eggs until the following spring. With the coming of cold weather they hibernate in cracks and crevices in the warehouse. Many of the larvae winter over in the flour without pupating, some of them free, others in pupal cells. In such cases pupation occurs in early spring.

Damage to Sacks and Woodwork

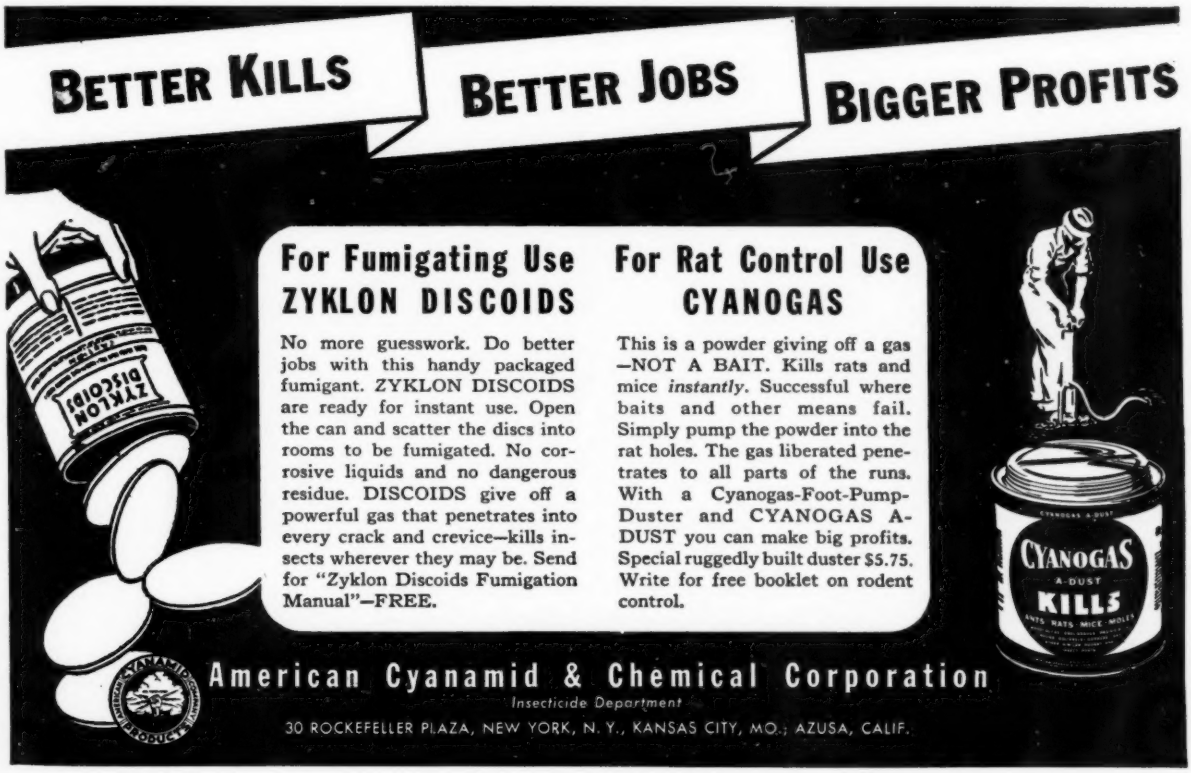
The larvae frequently leave the sacks of cereal products prior to pupation. In so doing they cut the fibres of the container and leave little piles of flour at the point of exit, which resemble in a general way the "pricking" caused by the larvae of the mediterranean flour moth. Where the infestation is severe so many of the fibres in the sack may be cut as to destroy the container.

(Continued on Page 12)



Piece of wood from a flour warehouse showing damage caused by the larvae in forming their pupal cells in the walls of the shed.

(After Gray, Proceedings of the World's Grain Exhibition and Conference, Vol. 2, Canada, 1933.)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A portion of a flour sack which contained infested flour showing the holes made by the larvae of the hairy spider beetle in leaving the bag.

(After Gray, Proceedings of the World's Grain Exhibition and Conference, Vol. 2, Canada, 1933.)

Spider beetle larvae cause a typical "scarring" of the wood in buildings in the formation of pupal cells prior to pupation. This often serves as a valuable aid in warehouse surveys indicating spider beetle infestation in past seasons.

Infestations vary considerably. In some cases only a few larvae are present per sack. All the stages in one badly infested 49-pound sack of flour were counted and a total of 3,126 was secured or about 64 insects per pound of flour. As the sack contained many holes made by the larvae in leaving this particular bag the population earlier in the season was even larger. All of this infestation occurred within a period of 8 months in a country warehouse. Surely no one would envy a warehouseman the task of explaining to a feminine customer why she received such a "prize" package.

Adult spider beetles with flour debris showing appearance of material removed by sifting.

(Original photo courtesy Division of Entomology, Department of Agriculture, Ottawa.)

One outstanding characteristic of the spider beetles is their ability to withstand low temperatures. Undercooling tests indicate that contact temperatures of minus 20°F. are necessary to kill the larvae. Flour has considerable insulating value. As the temperature at the center of a sack of flour during cold weather is from 10 to 20°F. higher than the air temperature at the time of reading, many of the sudden and extreme drops in temperature only penetrate a short distance into the sack. The temperatures in the warehouses themselves do not drop as low as the outside air temperatures and it seems highly unlikely that much mortality can be expected through the action of normal winter temperature. This is borne out by the examination of flour stocks maintained in unheated storage. Mortality ranged from very slight to about 30% in 98-pound sacks. Local outside air temperatures as low as minus 45°F. were experienced during the period of storage.

Spider beetles also exhibit activity at lower temperatures than most insects. In the case of **Ptinus raptor** Sturm. a number of the beetles were noted crawling slowly over the ground beneath a building when a thermometer in contact with the soil registered 32°F.

Several serious infestations have been encountered beneath large warehouses in which the floors were poor with wide cracks between the boards. The daily sweeping ensured a continuous supply of food and the populations increased enormously before being noticed. The insects ascended in the spring into the warehouse and the bags were literally covered with beetles. Prompt control measures and the installation of a tight floor eliminated further trouble.

The More Common Species of Spider Beetles

The white marked spider beetle, **Ptinus fur** L., is the oldest and best known member of the group and is now cosmopolitan in distribution. It was responsible for serious flour losses in Europe over one hundred years ago. This species was first reported from the United States in 1869 and in 1922 was recorded as recently introduced in Minnesota. It has never been accorded high rank as a cereal pest within United States. In Canada there are records of flour losses as early as 1893 and the species is widely distributed within the Dominion. In the Prairie Provinces it is frequently associated with the hairy spider beetle.

The hairy spider beetle, **Ptinus villiger** Reit., has caused by far the greatest damage to cereal products in Canada of any member of the group. It is the most abundant species in the Prairie Provinces but also occurs in Ontario and Quebec and to a lesser extent in the Maritime Provinces. The spider beetle problem in Western Canada dates from about 1915 and in the ensuing years had gradually increased in importance. This insect was able to establish itself largely because of its ability to withstand low temperatures and the practice of shipping carload lots of cereal products which frequently remained in storage for considerable periods of time.

The eastern spider beetle, **Ptinus raptor** Sturm., is the predominating one in the Maritime Provinces and in much of the Province of Quebec, in many cases being the only species recovered from these warehouses. Apparently of European origin, the first record of its presence in Canada was secured in 1935. In appearance, markings and life-history it is very similar to the white marked spider beetle.

Ptinus ocellus Brown (**tectus** Boiel. of authors') is apparently of Australasian origin and has been responsible for a considerable amount of damage in Europe particularly in Germany where it is an important stored product pest. It was first found in America at Victoria, B. C., in fish meal in 1927. While at present very largely restricted to the eastern and Western seaboard in Canada, these insects have been responsible for considerable damage to cereal products and other materials especially fish meal in the areas indicated.

The golden spider beetle, **Niptus hololeucus** Fald., is really the "Beau Brummel" of the group. The adult averages about 1/7 of an inch in length and is covered with long silky hairs and fine scales of a satiny brass shade. While not as serious a pest as the preceding species this insect is at times quite abundant. It has been a pest of considerable importance in Europe for some time and it was first recorded in North America at Halifax, N. S., in 1899.

Control

The question is frequently asked "Why not use parasites to control these insect pests?" While small "wasps" have been reared from the larvae and pupae of spider beetles, generally the presence of these natural enemies indicates an infestation of long standing rather than an effective method of control. Usually the parasites are present in relatively small numbers and to increase to the point where the spider beetles would be controlled would require a long period of time as well as enormous

numbers of the host. As the ideal to be attained in a warehouse is the complete absence of the pest, chemical means offer a better method of protecting our food products from such pests.

Proper warehousing methods aid greatly in combatting spider beetles. All incoming material, new or returned goods, should be carefully examined. Infested material should never be taken into the warehouse.

If the warehouse is kept clean at all times the breeding places will be reduced to a minimum.

Stocks of different ages should not be mixed and old stock should always be sold first. Slow selling lines often serve as breeding places for spider beetles. Small stocks are advisable in the warm weather where the turnover is slow.

The use of a contact spray against these pests is the type of control in general use. Many flour warehouses are not suited to fumigation and much of the control must be carried out when the temperature is below the optimum for most fumigants.

During the winter months most of the warehouse stock is replaced by new material from the mill. Early in the spring, therefore, the adults are found to a large extent on the outside of the bags or on the walls of the building. A vigorous campaign at this time against the adults will result in killing most of the beetles before the eggs are laid.

A spray consisting of extract of pyrethrum in a **water-white, refined** oil carrier has given good control and at the same time it has been possible to avoid the tainting of the product or the staining of the bags. Certain of the substitutes for pyrethrum such as aliphatic thiocyanate have also given satisfactory results. Applications of spray should be made in the warehouse as long as the adults are present. Liquid drops should not be allowed to fall on the stock and to ensure this it is suggested that the nozzle of the sprayer should be held at least 12 inches from the bags.

In badly infested warehouses many of the larvae burrow into the wood and unless the spraying and cleaning is very carefully done, new stock will soon be infested by the insects remaining in the cracks, etc. The use of lye solution at the rate of 1 pound of lye to 5 gallons of water has been very effective in certain badly infested warehouses. Prior to treatment, the building should be cleaned thoroughly and the resulting material burned. The lye solution should be applied by means of a sprayer to the floors, walls and ceiling, working it into all the cracks and crevices to reach the insects. The application should be made when the temperature is high enough to permit rapid drying of the woodwork. White-wash may be applied subsequently if desired. After treatment with lye it is essential that the flour and feed be piled on racks and kept away from the walls. If the lye comes in contact with the bags it will destroy them.

In certain areas the spider beetles have become well established. Even where a control campaign is so successful as to eliminate the insects completely from certain warehouses, there is always the likelihood of the insects being re-introduced into the premises. It will be necessary to learn to live with these pests, carry out regular control measures against them and conduct business on a profitable basis in spite of their presence. Insect control measures are a matter of routine in flour-mills, and the spider beetle problem merely emphasizes the necessity of adopting systematic control measures against insect pests in the warehouses as well.

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Preservatives, Priorities, and Processes

By GEORGE M. HUNT, *Chief, Division of Wood Preservation*, R. H. BAECHLER, *Chemist* *and* J. OSCAR BLEW, JR., *Associate Technologist*

Part 2

(*Continued from June Issue*)

Preservative Salt—Oil Treatments

Card treatment.—The Card treatment with a mixture of creosote and zinc chloride solution, which was used extensively for tie treatment prior to 1934, was originally developed as a means of economizing on cost by reducing the amount of creosote used per tie. It does not offer much of value in the present situation, however, because equal or greater saving of creosote can be accomplished by using creosote-petroleum solutions, which are more desirable and more effective than the Card mixture.

Zinc chloride-petroleum treatments.—Several types of zinc chloride-petroleum treatments have been described by E. R. Boller*(5). Since these treatments use no creosote, they have a distinct advantage over Card mixtures from the standpoint of creosote economy. Service records are not sufficiently comprehensive or complete to permit an exact comparison between these two treatments but it seems quite possible that the petroleum combination would at least equal the Card mixture in effectiveness and, because of the larger amount of petroleum oil injected per cu. ft., it might exceed the Card treatment. The effectiveness of the zinc chloride-petroleum treatment can undoubtedly be varied considerably, according to the absorptions of zinc chloride and petroleum used.

A disadvantage of the zinc chloride-petroleum treatment is that it is a two-movement process and, therefore, more complicated and expensive than a one-movement process. Another disadvantage is the uncertainty as to the zinc chloride supply but this is true of practically all preservatives.

Combination salt and oil treatments are not limited to zinc chloride but are possible with all accepted salt preservatives. Zinc chloride has the advantage over the other salt preservatives for this purpose, however, in that its solutions can be heated to over 200°F. without causing undesirable chemical reactions that reduce the concentration of preservative in the solution. This permits a high-temperature Rueping treatment with the zinc chloride solution, followed by a vacuum that evaporates some of the surplus water, and then the immediate application of the oil treatment. With preservative salts that cannot be heated to such high temperatures, less water is removed during the vacuum period and the wet wood is less suitable for the oil treatment. Air seasoning between the salt treatment and the oil treatment will, of course, remove the excess water and put the wood in excellent condition to receive a good oil treatment. This method is practicable with all the salt preservatives but the extra handling for seasoning and retreatment is expensive and the time required for the seasoning prolongs the processing period.

In short, petroleum-salt treatment can be applied in various ways, gives longer life than straight salt treatment, and avoids the use of creosote but has the disadvantage of being a two-movement treatment.

Other Preservative Salts

The preservative salts thus far mentioned, namely, Celcure, chromated zinc chloride, Tanalith, zinc chloride, and ZMA, are not the only water-borne, salt-type, preservatives that can be used. Various others are known that have more or less value even though not so extensively used. Their cost, availability, priority limitations, and other considerations greatly limit the ability of these materials to relieve the shortage of other preservatives, nevertheless they may in individual cases be very practical and economical to use and they should not be overlooked. Among them are the following:

Aczol is a proprietary preservative solution containing copper and zinc salts and ammonia. In one test (13) Aczol in heavy absorptions has given excellent results but in another test (2) it has not done so well. It seems unlikely that Aczol can be made available in sufficient quantity to contribute much to the relief of the shortage of creosote and other preservatives or that it will be economical to use in the high absorptions that appear to be desirable for a high degree of protection. Nevertheless, Aczol undoubtedly has preservative value and should receive consideration when it is available in an emergency.

Borax has been shown (4) to have greater toxicity to fungi than zinc chloride and in a service test on 200 red oak ties (2) with absorptions of 0.24 and 0.59 lbs. of borax per cu. ft., only about 4 per cent have been removed for decay in 13 years. A group of 31 southern yellow pine fence posts pressure treated with an average 1.05 lbs. of borax per cu. ft. shows about 55 per cent removals after 15 years service in Wisconsin. The Barro Colorado Island tests (13) indicate that borax treated wood in contact with the ground does not have high resistance to termites but it cannot be determined from these tests whether the lack of resistance was due to leaching or to low inherent toxicity to termites. Until that question is settled, it would not be wise to depend upon borax for protection against termites, even where there is no opportunity for leaching.

Borax is rather strongly alkaline in reaction and may possibly have some effect on the strength of the wood. The service tests thus far fail to indicate any adverse effect on strength but they are no proof that there is no such effect. So far as fence posts and similar products are concerned there seems little to fear, but for timbers that must carry heavy loads some caution should be exercised.

Bateman and Baechler (4) suggested that a mixture of borax and boric acid, being neutral in reaction, would be less likely to damage the wood (and paint) and would still be nearly as toxic to fungi as the straight borax solution. Only one service test of such a mixture appears to have been started (24). One hundred southern yellow pine fence posts pressure treated with an average absorption of 0.9 lbs. of 50-50 borax-boric acid per cu. ft. and placed in test on the Harrison Experimental Forest in Missis-

*Numbers in parentheses refer to list of references at the end of this paper.

sippi showed no removals at the end of 4 years but 4 per cent were showing evidence of termite attack.

In normal times, borax is cheap and plentiful and the borax-boric acid mixture should be competitive in cost with other salt preservatives. Under present conditions the demand for borax for other uses is heavy and its availability for wood preservation is questionable. This situation may change, however, for there is plenty of borax in the ground and increasing the refining capacity could provide all the borax and boric acid needed for all uses. Whether that will be accomplished in the near future we are unable to predict.

Chemonite is a proprietary copper-arsenic-ammonia wood preservative (8) that has found some commercial use on the Pacific Coast. Its continued availability obviously will depend upon the availability of the chemicals of which it is composed. The preservative has not been fully evaluated or generally accepted nor is it yet certain that the optimum absorptions have been arrived at. Nevertheless it appears to be doing very well in unreported service tests and there can be no doubt that Chemonite preservative, when properly applied, can give a considerable degree of protection against decay and termites to wood in contact with the ground. It has not yet reached the stage of development that would justify its general acceptance as a so-called "standard" preservative because it has not had sufficiently extensive use over a long period of time. The results that have been obtained to date, however, are very promising and justify favorable consideration. It certainly should not be ignored for land use where it is economically available and where it may often be a practical alternate to turn to in emergency. Its suitability for marine use is open to question and has not been sufficiently demonstrated to justify our recommending it for the protection of piles in salt water.

Mineralized-cell preservative.—This is a proprietary preservative said to contain arsenic trioxide, zinc sulphate, and copper sulphate, all of which are known to have preservative value. It stands to reason, therefore, that wood properly impregnated with a sufficient absorption of this mixture will have its decay and termite resistance increased. Since the preservative has found some use for the treatment of piles in Pacific Northwest for a number of years, it should be possible to obtain service records that indicate the magnitude of its effectiveness but none are known to have been published. It is not reasonable to suppose that a preservative of this character would give much protection to piles in salt water and the published (18) and unpublished information available recommends strongly against its use for that purpose. It may, however, compare well with various other salt preservatives for land use and may properly receive consideration for such use when available in an emergency.

Miscellaneous salts.—There are, of course, other salts, which either should have or are known to have more or less preservative value, that have not been used to any significant extent for commercial pressure treatments, if at all. Such salts, however, are unlikely to be freely available now. About all that need be said about them now is that they could probably be used to advantage if they were available at reasonable cost. Among these are mercuric chloride, which is a powerful preservative but expensive, corrosive and poisonous; Boliden salt (9); greensalt (Ascu) (17, 19); sodium fluoride; copper sulphate; arsenates and other salts of nickel;

RAT CONTROL

According to a recent Government publication, rats are still "Mankind's greatest enemies in the animal world."

The destruction of these dangerous rats is one of the pest controller's most appreciated and satisfactory tasks. The weapons at his disposal are the substances known as POISONS.

POISONS require careful and skillful handling in preparing the baits with foodstuffs attractive to rats. The baits should be small and frequently changed.

We enumerate below some of the poisons most frequently used for this purpose:

Barium Carbonate, a mild poison, a white tasteless powder, comparatively safe. 1 lb. 25c, 5 lbs. @ 20c per lb., 25 lbs. @ 15c per lb.

Phosphorus Paste, rats seem to have a liking for this. 1 lb. 50c, 5 lbs. @ 45c per lb., 25 lbs. @ 40c per lb.

Rumetan (Phosphide of Zinc), an effective rat poison to be mixed with lard. 1 lb. $1.60, 5 lbs. @ $1.50 per lb.

*__Arsenic Pure Powder,__ a white tasteless powder, highly poisonous. 1 lb. 25c, 5 lbs. @ 20c per lb., 25 lbs. @ 18c per lb.

*__Arsenate of Sodium Pure,__ an easily soluble arsenical. 1 lb. 75c, 5 lbs. @ 70c per lb.

*__Strychnine Sulphate,__ highly poisonous. 1 oz. vials 75c, 5 oz. cans @ 70c per oz.

Red Squill, the genuine imported product, the safest Rat Poison. Poisonous to rats, safe to humans and domestic animals. Powder $1.00 per lb. Fluid Extract, Pints $1.50, Quarts $2.50, Gallons $9.00.

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and a variety of others that have been included in various field experiments but not commercialized as wood preservatives.

Processes

To the operators of commercial pressure treating plants, there would seldom, if ever, be any advantage in turning to a nonpressure treatment. For the user of pressure treated wood, however, certain nonpressure treatments may be useful in an emergency when the customary pressure treated material is unavailable. Similarly, users of butt-creosoted poles, in facing a creosote shortage may have to turn to other methods as well as preservatives.

Standing pole treatments.—Standing poles that have begun to decay at the ground line can have their service life materially prolonged by ground line treatment if the upper parts are in good condition and the decay at the ground line has not progressed too far. Several types of such treatments have developed during the last 10 or 15 years. Their relative effectiveness and economy has not been worked out but enough information has been obtained to indicate that a number of them have merit under normal economic conditions and that they can extend the life of poles several years. In the present emergency they may prove very useful to public utilities in the event of a shortage of their preferred creosoted poles and with the necessity of making their standing poles last longer.

These various ground line treatments have been described in publications or are being actively promoted by their proprietors and it seems unnecessary to describe them individually here. Several of these treating methods use coal-tar creosote, including the charring and spraying method (11), the "sand-collar" method developed by the Hydro-Electric Power Commission of Ontario (15), the "impregnated sawdust collar" method (16), pouring creosote in the earth around the poles, and no doubt others. They, of course, use less creosote per pole than is required to treat a new pole and in that way economize on creosote. Still greater creosote economy is obtainable, however, by using pole base treatments that contain less creosote, such as the Osmose and Pfister treatments, or the Anaconda arsenic paste method, which uses no creosote.

The Osmose method.—The Osmose method is a nonpressure method of treating lumber, poles, mine timbers, posts, and similar materials in the green condition and without the use of creosote. Its economy and effectiveness in comparison with "standard" preservatives and treatments remain to be worked out. No doubt they vary widely under different circumstances. The fluoride - chromate - arsenic-phenol preservative that is applied to the surface of the wood in paste form does penetrate appreciably under favorable circumstances, however, particularly in sapwood. Such treatment should have effectiveness in proportion to the absorption and penetration obtained and, in pine posts and timbers, this has been shown to be considerable. The nature of the preservative is such that the treatment cannot be expected to have the effectiveness of creosote impregnation in material that must be in contact with the soil or water but in emergencies, and particularly in places remote from pressure treating plants, the Osmose treatment warrants consideration. The chemicals of which the Osmose preservatives are made, however, like most other preservative chemicals, are available in limited quantities and this restricts the extent to which treatment by this method can be expanded.

The steeping process. — Merely soaking green or dry wood in a heated or unheated water solution of preservative salt for a week or two, is much more efficacious than is commonly supposed. Its use, of course, depends on the availability of preservative salts and its value is primarily in places remote from pressure treating plants or for quantities of material too small to interest such plants. When mercuric chloride is applied by this method, remarkable results are sometimes obtained and very good results have been obtained with zinc chloride and sodium fluoride, as is shown in the 1942 report of the Committee on Post Service Records (1).

Oil-salt combination for poles.—A pole treating method that has had some use in recent years is to apply full length pressure treatment with a salt preservative then, with or without subsequent seasoning, to apply a hot-and-cold bath creosote treatment to the butts. This serves to economize on creosote as well as to provide a pole that is "clean" above the ground line. The process appears to have considerable merit and for some uses it justifies careful consideration.

Tough Either Way

Sign in a restaurant: "We know it's tough to pay 60 cents for a steak, but if you pay 35 cents it's tougher."

There are various other methods of treatment that might be mentioned (11, 3) including several of the Boucherie type, that can sometimes be used in an emergency or under special conditions, but it seems unnecessary to catalogue them here.

Summary

The foregoing discussion has forecast that the amount of creosote produced in 1942 for wood preservation from domestic sources will considerably exceed the domestic production in 1941 but that we enter 1942 with such low stocks that the amount of domestic creosote available for use in 1942 may not exceed that of 1941. If the authorities decide that the military needs permit, enough foreign oil can be imported to supply all requirements not met by domestic production. This is strictly a problem of wartime economics, however, and what the decision will be only those in control can determine.

The preservative salts in common use or that might be used are all of more or less limited availability. Zinc chloride seems least likely to be seriously restricted but not one of them will be available in unlimited quantities and it should cause no surprise if any or all of them should be less available for wood preservation in 1942 than in 1941.

The only toxic preservative that, at present, seems likely to be more available in 1942 than in 1941 is pentachlorphenol. Extenders for creosote and solvents for pentachlorphenol, either in the form of ordinary fuel oils or aromatic byproducts of petroleum cracking processes seem likely to be available in any quantity that may be needed for wood preservation.

Among the substitute materials or practices that seem most promising today for immediate use if needed for large volume treating requirements are the following: use higher percentages of petroleum or tar in creosote solutions, raise the limits on the percentage of creosote distillation residue above 355°C. where such limits have been set up, and use pentachlorphenol in petroleum solutions. Obviously the practicability of these and other methods will vary considerably in different places and circumstances and may be upset at any time by new developments. There is also the possibility that the need for them may be largely avoided by a reduction in the amount of timber to be treated.

The results of adversity are not always evil and not infrequently the things we are forced to do against our will have unexpectedly beneficial results. The research for substitutes

should broaden the knowledge of us all and we may find that some of the substitute materials or methods will prove economical and desirable for continued and even expanding use under the highly competitive conditions that we all expect to exist after the present emergency is over.

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Bugs Get Express Trains to Swiss Feed Factories

BERNE, Switzerland—The Swiss railroad authorities have announced that they have made special arrangements for the rapid shipping of cock-chafers (a brown insect about the size of a thumbnail), thus calling attention to a strange by-product of the war.

From the insects "cockchafer meal" is produced for feeding poultry and hogs. Several plants have been organized in Switzerland for the manufacture of the meal but the difficulty is that the cockchafers must be incinerated alive. Hence the special railroad arrangements.

The insects begin to appear in swarms late in April and school children are encouraged to gather them by a bonus of 5 cents a pound.

Scientists assert that the nutritive value of "cockchafer meal" is very high. It is hoped to produce at least 1,000,000 pounds of it this year.

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Flea and Louse Control

Control of Fleas on Domestic Pets Is But a Small Section of the Expanding Market for Flea and Louse Preparations

EDITOR'S NOTE: *Reprinted from Soap and Sanitary Chemicals, December,* 1941.

ALTHOUGH many of the older powders for the control of fleas and lice on domestic and farm animals, as well as humans, are still based principally on pyrethrum, there has been a marked increase in the use of rotenone derivatives in these products over the past five or six years. The use of derris or cube diluted with inert dusts or powders represents a common form of the newer flea and louse powders. There are also products on the market which are mixtures of rotenone dusts with pyrethrum. Although there has been a trend toward the wider use of rotenone in flea and louse products in the United States in recent years, powdered derris root was used in England over twenty years ago in these preparations because its efficacy against these insects was recognized then.

The product which comes first to mind in thinking of the market for flea and louse preparations is the standard two or three ounce can of flea powder for domestic pets. In these preparations, rotenone has found a wide use during the past few years for several reasons. A standard product consists of 1 per cent of rotenone, 2 or 2½ per cent of other derris resins, and the balance inert dust such as talc, chalk, or rice starch, the latter being a good extender because it is said to give a gloss to the coat of the animal. In some of these rotenone products, less rotenone is used and a percentage of pyrethrum added. The cost of a rotenone flea powder on the whole for the past five years has been considerably less than a product based mainly on pyrethrum and this may have been a factor in the trend toward increased use of derris and cube.

It is worth noting that in the ten years since derris was first imported into the United States in commercial quantity, annual consumption has grown to a present estimated figure of eight to ten million pounds, and substantial quantities of this total are going into louse and flea powders. So fast has this market developed that many government publications on which the householder and the farmer often depend for their insect control advice are out of date on the suggestions they make, not having been revised to bring them in step with current practice.

Some of the older products on the market still hold to their pyrethrum formulas. A well known product consists of a mixture of 65 per cent pyrethrum, 30 per cent powdered sulphur and 5 per cent inert. Incidentally the company packing this product would do well to revise its label, as it has not been the best form for the past year to use on a label such a phrase as "pyrethrum—60 per cent." Regulations of the U. S. Department of Agriculture call for listing the percentage **pyrethrins** content specifically, and classifying the balance of the pyrethrum as inert.

Other products combine pyrethrum and rotenone,—the combination being a good one, as it couples the quick action of pyrethrum with the sure kill of rotenone and its tendency to prevent reinfestation. One popular product of this type contains 1.00 per cent rotenone, 0.12 per cent pyrethrins, 4 per cent ethyl ether extractives (resins), and 94.88 per cent inactive ingredients. Rotenone is also used in conjunction with sulfur in other products. Many of the better products use specially processed rotenone derivatives, rather than straight derris or cube powder. One very good product is made by dissolving derris resins in a solvent and dispersing on a carrier. This procedure increases the availability of the insecticidal activity considerably.

Most of the products are recommended also for control of lice, dog ticks, sticktites, etc. as well as fleas. Use on the human body to control chiggers, head, body and crab lice is also commonly suggested. The problem of controlling lice on canaries is rather unique. Powders made with rotenone and a talcum base give the canaries mechanical pneumonia, and the only type product which can safely be used is a straight pyrethrum powder.

Of the many varieties of fleas there are three that are the most common and serious pests. These are the dog flea **(Ctenocephalides canis Curtis)** the cat flea **(C. felis Bouche)** and the human flea **(Pulex irritans L.)**. The stick tight flea is another pest common in the south **(Echidnophaga gallinacea Westw).** Numerous rodent fleas also found associated with human habitations include the oriental rat flea **(Xenopsylla cheopis Roths.)** the European rat flea **(Nosopsyllus fasciatus Bosc.)** and the mouse and rat flea **(Ctenopsyllus segnis Schon.)**

All fleas require blood to reproduce, and while they prefer certain hosts, will transfer their attentions to man or any other animal in the absence of that host. They often breed in large numbers in basements or outbuildings where dogs, cats or farm animals are kept. Even when their hosts are taken away, the flea maggots proceed with their development, and the resulting adults may live for several weeks without food. This explains the frequent cases of people returning home after an extended trip to find their homes apparently unaccountably overrun with fleas.

This all serves to emphasize the point that it is not enough to clear up individual dog and cat infestations to solve an acute flea problem. The breeding places themselves must be treated. A good spraying with a regular liquid fly spray or properly diluted coal tar disinfectant in the infested basement or barn is usually effective. One-half gallon for 1,000 square feet of floor space is about the right quantity. A compressed air sprayer or a bucket pump fitted with a high pressure hose serve best with the disinfectant. Of course all refuse in which the fleas may breed should be swept up and burned prior to the disinfectant spraying.

When fleas have infested living quarters and are breeding in rugs, furniture, etc., naphthalene is ordinarily effective. About five pounds is the proper amount for a normal sized room. It should be spread well over the floor and furniture and the room closed off for a day. A thorough spraying of the rug, carpet, furniture, and crevices with a good fly spray is likewise effective. In severe infestations fumigation with hydrocyanic

acid or methyl bromide are sometimes resorted to.

In the same general family as flea powders are the insecticidal shampoos. A well known product consists of a 20 per cent coconut oil soap with the addition of camphor oil, pyrethrum, rotenone and derris resins. It is recommended for washing pets and is suggested also as a treatment for head lice and crab lice on humans. For the latter purpose rotenone and pyrethrum products seem to have come into much more common use in recent years, replacing the conventional larkspur or blue ointment to a considerable extent. Blue ointment has the disadvantage of being poisonous and larkspur is not readily available. There is danger of skin irritation with mercurial ointment which should not be used too freely or over too much of the body at one time. As the average person is not allergic to pyrethrum and derris in the concentrations commonly used, their use in the control of lice on humans has made much progress in recent years.

Man is commonly attacked by the head louse **(Pediculus humanus L.)** the body louse or "cootie" **(Pediculus humanus corporis Deg.)** and the pubic or "crab" louse **(Phthirus pubic L.).** Besides being a serious annoyance, lice carry typhus fever, relapsing fever and trench fever. Effective control involves eradication of lice and eggs on the body as well as those in the clothing and living quarters. Disinfection must be systematically undertaken and treatment of the individual, his clothing, living quarters, etc., should be simultaneous.

In treating head lice, close clipping of the hair is an aid, although not absolutely essential. Derris or cube powder of about 3 per cent rotenone content is commonly used and is effective either as a dust or as a wash. When applied as a wash the following proportions are recommended in Circular No. 9, U. S. Department of Agriculture: derris or cube powder, five level tablespoonfuls, neutral soap, two level tablespoonfuls, and one quart of warm water. A second application is necessary ten days later. Warning should be given the user to keep the wash from contact with the eyes.

The same circular recommends a liquid soap of the following formula for the treatment of body lice: one part of soap chips boiled in four parts of water, with the addition of two parts of kerosene. Derris or cube powder, 3 per cent, are also effective. Two powders of the following composition are also recommended:

(1)	Talc	20 gms.
	Naphthalene	½ gm.
	Iodoform	½ gm.
	Creosote	1 cc.
(2)	Talc	20 gms.
	Sulphur	½ gm.
	Creosote	1 cc.

For pubic lice, derris or cube powder or ointments are effective. The ointment is made by mixing one part by volume of powder (200 mesh, 4 to 5 per cent rotenone) in ten parts of petrolatum. Effective use of a pyrethrum ointment, containing 2 per cent pyrethrins in petroleum jelly, is also described by Angevine in **Soap and Sanitary Chemicals,** March, 1941.

A pest, which, like the flea and louse, is extremely annoying to both man and domestic animals is the chigger. It is the first or larval stage of a large red velvet mite which when mature is entirely harmless. Although the chigger carries no specific disease, its bite can be a serious annoyance. Chiggers are also serious pests of chickens and other fowl. In general chiggers are more troublesome throughout the southern states and in several of the mid western states. As

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they crawl up from long grass they commonly attack the extremities. Cutting grass and underbrush and applying fine dusting sulphur, about one pound to a thousand square feet, is the normal control. It is necessary to repeat several times at intervals of a week, especially when the applications may be followed by rain.

Sulfur dust has also been used for many years for dusting the body and clothing, the finer sulfurs (325 mesh) being preferred. Skin eruptions may result from too frequent applications. Light applications of kerosene or fly spray have also been recommended, but it would be a tough skin indeed that could stand extended exposure to such a treatment. More recently a new product has appeared on the market which is reported to have shown up very well in test use by the Second Army in their recent Louisiana maneuvers. It is understood to have hydrogenated rotenone as its active ingredient. Applied to the ankles, wrists, legs and neck, it is reported in test applications to have reduced bites by 90 per cent.

Turning to the broader field of louse control on farm animals such as chickens, horses, cattle, sheep, hogs, etc., the rotenone products encounter a longer list of competitive products which have become entrenched in the farm market through many years of government recommendation and farm use. In spite of this handicap rotenone dusts have made tremendous strides in this field over recent years, and the volume of present and potential business dwarfs the home consumption market.

For control of lice on poultry the common treatments have been sodium fluoride, nicotine sulfate, tobacco dust, carbolated petrolatum, powdered sabadilla, naphthalene-sulfur compounds, etc. Sodium fluoride, although recommended in U.S.D.A. Farmers' Bulletin No. 1652, has the very obvious disadvantage of being extremely poisonous. Nicotine sulfate has the drawback of decomposing rapidly, as do nicotine-lime dust mixtures. Nicotine sulfate painted on chicken roosts has long been used, but in confined quarters the fumes are dangerous and quite commonly result in asphyxiating the poultry they are supposed to protect. The strong smelling naphthalene-sulfur preparations are less used today than they were ten or twenty years ago. Sabadilla, too, is less used today for chicken louse control.

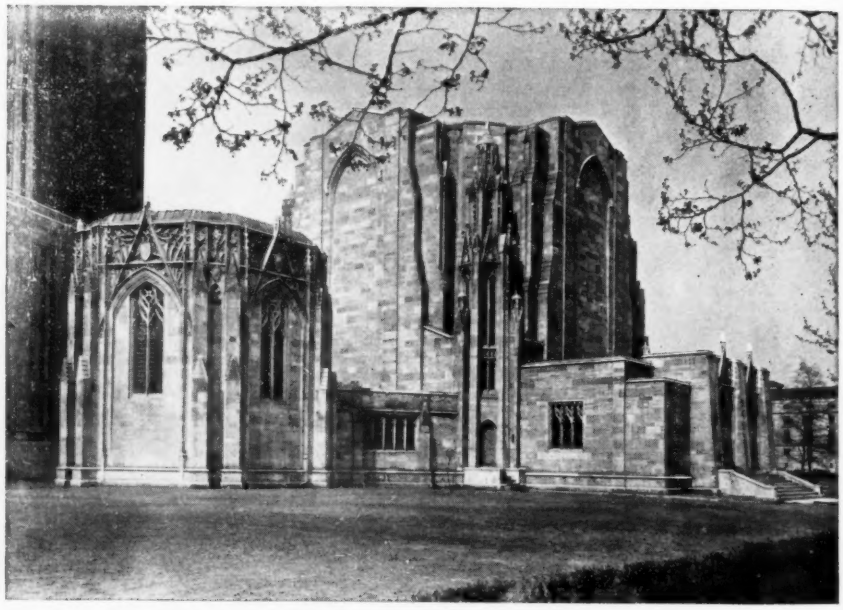
Pyrethrum and rotenone are the coming products in this market, either extended as dusts or in mixture with naphthalene. The same qualities that have brought rotenone to the fore in the home market for flea control apply equally well for louse control on farm animals. Sure kill and tendency to prevent reinfestation make it the preferred active ingredient. Rotenone content of dusting powders for louse control is commonly much lower than that necessary in flea powders,—in the neighborhood of one-half to one per cent for a farm louse powder. Considerable quantities of derris powder are also used on the farm in the form of a liquid application to guard against the warble fly,—the powder being mixed with water and soap.

There are at least seven different common species of lice infesting chickens, while other varieties are found on turkeys, ducks and guinea fowl. The two most important lice attacking chickens are the head louse **(Lipeurus heterographus)** and body louse **(Menopon biseriatum).**

There are three kinds of lice commonly found on cattle, — the short nosed cattle louse **(Haematopinus eurysternus),** the long nosed cattle louse **(Linognathus vituli),** and the common biting lice **(Trichodectes scalaris).** Only one louse commonly infests hogs **(Haematopinus suis).** There are at least five species of goat lice,—the two blue goat lice **(Linognathus stenopsis)** and **(L. africanus),** the yellow or hairy goat louse **(Bovicola penicellata)** and the two red goat lice **(Bovicola caprae** and **B. limbatus).**

For many years the standard method of controlling lice on cattle, goats, hogs, and other members of the farm population has been dipping. Arsenical dips, coal-tar-creosote dips and nicotine dips have all been widely used, although all have objectionable features. The arsenic dips present a

Views of Pittsburgh, Pa—N.P.C.A. Convention Site



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"Old Black Joe"
"O Susannah"
"My Old Kentucky Home"
"Massa's in the Cold, Cold Ground"

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Here may be found the original manuscripts of these famous songs, first editions, pictures, letters, Foster's melodeon, flute and other Fosteriana which is housed in this Foster Shrine.

serious poison danger, the coal tar dips frequently stain the hair and may leave it in bad condition, a particular disadvantage in control measures on sheep, and the nicotine dips are described by one authority as undependable below 0.07 per cent nicotine and dangerous at higher concentrations.

As alternatives to dipping, farmers have long used spraying and hand applications. For winter use, in weather too cold for dipping or spraying, farm bulletins of even 15 or 20 years ago recommended dusting of powders having naphthalene and pyrethrum as active ingredients. It has been the substitution of rotenone derivatives in some of these powders and the increased use of powders to replace dips over recent years that have been the real innovations in louse control on the farm.

Fleas Send Divorce Rate Up In Germany

Margaret Browns, eighteen, of Philadelphia, formerly employed by a lawyer in Stuttgart, said that the German divorce rate has increased tremendously. She said that wives were dissatisfied because their husbands were away so long at the front, and when they did return they had fleas.

Live Mouse Found on Airplane at Miami Quarantine Station

What is believed to be the first reported instance, at least in this country, of a live mouse being found on an airplane at quarantine has been reported by Surgeon G. L. Dunnahoo, medical officer in charge of the Miami (Fla.) quarantine station. Dr. Dunnahoo states that, on April 16, 1942, a live mouse was recovered from the galley of a plane on inspection after its arrival at Miami from San Juan, P. R. The mouse was identified as **Mus musculus musculus.** A careful search revealed no ectoparasites.

Quarantine officers have frequently considered the possibility that rats may become undesirable and dangerous stowaways on airplanes, and thus add to the potential hazard of introducing plague from infected areas by this rapidly expanding means of transportation. Considering the increase in the size of transport planes, the carrying of foodstuffs that are attractive for rats, and the ingenuity of these animals in boarding vessels, seeking food supplies, establishing nesting places and avoiding man's devices for destroying them, the possibility of rats boarding airplanes is certainly not remote. And should an infected rat, harboring **Xenopsylla cheopsis** or other species of flea transmitter of plague, succeed in stowing away for the trip, the danger of human infection developing would also not be remote. That danger could be completely eliminated only by eliminating the rat and its fleas, including those which may have left the host. Before this shall have been accomplished, however, the infection may have been transmited to some of the passengers or members of the crew.

The finding of a mouse aboard a transport plane at its destination indicates the possibility that rats may well emulate their smaller brother, and it definitely emphasizes the necessity for greater vigilance on the part of airplane companies and guarantine officers in combating this danger. The value of prevention with reference to plague, as well as to other quarantinable diseases, is predicated upon the fact that, while it may be comparatively easy to keep the disease out of a seaport, it would require much time and effort to eradicate the infection when once it has gained a foothold.

—Public Health Reports, 5-8-42.

Fortifying Domestic Red Squill

Red squill, one of the most effective rat poisons, may be obtained from domestic sources, through a "fortifying" process developed by Glen Crabtree, biologist at the Denver, Colorado, Wildlife Research Laboratory. The drug has been imported from the Mediterranean regions, a source now cut off. Red squill has been grown in this country, but the U. S. grown bulbs have never been sufficiently toxic to kill rats. Mr. Crabtree's process consists in extracting the poisonous principle from pulverized U. S. Bulbs with alcohol, and adding it to other dried squill to raise its level of toxicity. Large supplies of effective rat poison are needed, now that protection of Army cantonments has been added to the already existing danger of these pests, and the $189,000,000 worth of property damage yearly for which they are held responsible.

—Science Service, March 1942.

Replacement for

SODIUM FLUORIDE

There is no need to let the shortage of sodium fluoride handicap your operations—or its high price raise your costs. Dozens of exterminators are finding "ALVOX" roach powder to be a superior, low-cost replacement material, combining quick and certain kill with safety in use. Compounded from sodium tetraborate, pyrethrum and nicotine, it has been tested extensively in the field over recent months and a volume of repeat orders from the trade attest to its efficiency. Effective also against ants, fleas, beetles, crickets and silverfish.

ALVOX LABORATORIES

667 Bergen Street **Newark, N. J.**

Prepared to Kill?

Prentiss Pyrethrum Products with high **Pyrethrins** content are your best guarantee of dependable **Killing Power.**

Prove to yourselves that **Prentiss Pyrethrum Products** can be relied upon for **High Killing Power at a Minimum Cost.** Write for samples and prices on—

- **CLARIFIED PYRETHRUM No. 20**
- **HIGH TEST PYRETHRUM POWDERS**
- **ACTIVATED DUST**
- **POWDERED RED SQUILL**
- **POWDERED DERRIS ROOT**

Wise PEST CONTROL OPERATORS are substituting PYRETHRUM POWDER for SODIUM FLUORIDE which is almost UNOBTAINABLE. For this SUBSTITUTION PYRETHRUM POWDER of lower PYRETHRIN CONTENT may be used. Write us for special prices.

R. J. PRENTISS & CO., INC.

80 JOHN STREET **NEW YORK**

Effects of Infra-red Irradiation on the American Cockroach

By G. F. MacLEOD, *University of California, Berkeley*

CONSIDERABLE interest has been aroused by the appearance of a device purported to have a "lethal ray" which is particularly destructive to insect life. A few preliminary tests of this apparatus have been made and it seems desirable to record the results.

The essential feature of this equipment, is an incandescent lamp silvered inside on all but the seal-off end with an outside amber coating over the unsilvered portion. It contains a heavy, spiral filament and fits into any normal lamp socket. The housing supplied for this lamp is of aluminum, lined with asbestos. The outfit operates from any 100-115 volt circuit. Measurements of the energy in various regions of the spectrum when the lamp was operated at 115 volts gave a total of 254 watts with 163 watts in the infra-red, 55 watts in the visible and none in the ultra violet.

The lamp, in its holder was clamped to a ringstand so that a vertical beam could be used in all tests. All distances were measured from the seal-off tip of the lamp to the insect or plant and all exposures were timed with a stopwatch. Records of both the temperature at the surface of the insect and air temperatures just above the insect were kept in all tests because it was evident that there were marked differences. Adults of the American cockroach **(Periplaneta americana)** of comparable ages were used as test insects. All specimen were from a stock maintained for many generations in a constant temperature-humidity chamber and after treatment all of the insects were kept in the same chamber.

In the first tests at a distance of 18 inches from the lamp, adult roaches, irradiated on the ventral surface died in from 2½ to 4 minutes. The maximum air temperature was 26°C. and the maximum temperature at the surface of the insects was 43°C. In parallel tests irradiating the insects on the dorsal surface 4 to 6 minutes was required to kill the roaches whose tegminae reached a maximum of 47°C. while air temperature never exceeded 30.5°C.

A series of tests were conducted using a running water screen. The screen used was a tray of Pyrex glass 3 mm. in thickness holding 2 quarts of water. The water was 1¼ inches in depth and a constant flow was maintained. Insects were exposed at a distance of 18 inches for 10 minutes during which time the maximum air temperature was 21°C. and the temperature at the surface of the insect bodies was never above 25°C. None of these insects died and the females produced normal progeny.

Another group of insects irradiated on their venters for 1.5 hours at a distance of 40 inches from the lamp without a screen all died during treatment. In a second group similarly treated for 2 hours at 50 inches only 50% of the individuals died, some during treatment and some 5 days after exposure. Surface temperatures of the roaches in these trials reached 46°C. in the former and 42°C. in the latter test.

Necheles (1924) has shown that while roaches may die at 38°C. in moist air, they may survive at 48°C. in dry air. In all of these tests the humidity of the room was never above 30% relative humidity and an electric fan was kept in continuous operation blowing a large volume of air directly across all insects which were irradiated. Conditions for survival were therefore near optimum but no insects whose body surface temperature exceeded 40°C. during treatment in these tests survived.

In an effort to determine the possibilities of race death as a result of sub-lethal dosages of infra-red, groups of roaches were separated as to sex. One group was used as a control and neither sex treated, in another the males only were irradiated, in a third the females only were treated and in a fourth both males and females were irradiated. Each insect was given a separate treatment on the ventral surface. The dosage used was determined experimentally and set at one minute exposure at 23 inches from the lamp. The insects were kept in groups of 10 females and 10 males in a container, with all containers held in the stock culture room and examined weekly. The results of this experiment, which was carried over a 45 day period, are shown in Table 1.

While certain interesting trends are indicated in the data more extensive studies must be made before the true significance of these limited tests can be calculated. The body temperatures of irradiated roaches both male and female were about 10°C. higher than the temperature of the surrounding air. In no case did these temperatures approach a lethal point and only one out of the 780 roaches used died during the experiment. A high percentage of nymphs emerged from all the egg capsules produced.

The results in terms of water and food, or puppy meal, consumed per day are expressed on the basis of 20 insects. The group in which both males and females were irradiated consumed less water and more food than any of the others, but produced about the same number of egg capsules as those insects in which only the males were treated. Most marked deviations from normal occurred with the group where the treated females were kept with untreated males.

Table 1.—Results of treating cockroaches with sub-lethal dosages of infra-red radiation.

Treatment		Maximum Temperature During Treatment		Water Consumed:	Food Consumed:	Total Egg Capsules Produced
Males	Females	Air	Roach	Roach/day	Roach/day	Per Female
None	None	—	—	4.40	.57	12.30
Irradiated	None	24°C.	33°C.	4.25	.58	10.80
None	Irradiated	23	33	3.77	.28	8.60
Irradiated	Irradiated	23	35	2.97	.65	10.70

There is no apparent explanation of the decrease in food and water consumed when the females only were treated as contrasted with the group in which both males and females were irradiated. Further studies are needed to establish the significance, if any, of these discrepancies.

All trials with insects on plants which have been made indicate that the plants were injured before the insects feeding on them were killed. Tests of mites, mealybugs, aphids and white-flies on several plants have been made in the greenhouse. In every case dosages which killed the insects destroyed or seriously injured the plants. While possibilities of establishing a safety differential in favor of the plant have not been exhausted, the probability of doing so seems remote at present.

Summary—An incandescent lamp capable of producing and focusing a large amount of infra-red radiation was used to kill adults of the American cockroach. The insects were killed by a 2½- to 4-minute exposure of the ventral surface to radiation from this lamp at a distance of 18 inches. Double this dosage was required to kill the insects when they were treated on the dorsum. When roaches were irradiated through a water screen, which removed a large part of the infra-red, none of them were killed.

In an experiment to test the possibility of race death resulting from sub-lethal dosages of radiation, most marked deviations from normal occurred when irradiated females were placed with untreated males. No general trend toward race death as a result of the treatment was apparent.

All attempts to date to kill insects on plants have resulted in injury or death of the plants before the insects were killed.

Literature Cited

Necheles, H. 1924. Temperatures regulation in Periplaneta. Arch f. ges. Physiol., 204: 72-93.

Moths Again

"Moths have caused so many electric circuit switching failures by making a meal of the felt washers used in power line equipment that these washers are now being treated with a liquid insecticide to make them unpalatable."

—Pathfinger, April 18, 1942.

Encouraging words do the most good at home.

WPB and Insecticide Materials

The latter part of April the War Production Board issued a report on the relative scarcity of certain defense chemicals. Included in the list that generally are critically essential for the prosecution of the war, are the following materials which enter into the manufacture of insecticides: "Copper, copper scrap, lead, chlorinated hydrocarbon refrigerants (these includes Freon), chlorinated hydrocarbon solvents (these include ethylene dichloride), chlorine, diphenylamine, formaldehyde, phenols, and cashew nut shell oil (this is used in making Cardolite, which is used in dissolving rotenone in mineral oils)."

Another list of insecticide materials, also necessary for war production and essential industrial activity, but the supply of which is not so critical include antimony (a constituent of tartar emetic), arsenic, barium carbonate, borax, carbon tetra-chloride, casein, cryolite, molasses, mercury, sugar and zinc.

—Crop Production Institute Circular, May 6, 1942.

FOR SALE
CRESYLIC ACID
WILLIAM D. NEUBERG COMPANY
420 Lexington Ave. New York, N. Y.
Telephone LE 2-3324

PROTECT YOUR WORKMEN WITH ACME GAS MASKS

The efficiency of fumigators is increased when they wear the proper gas mask. Especially is this true when the fumigator is wearing the Acme No. 4 Gas Mask which permits him to have Full Vision (see illustration), to either side, upward and downward. The wide, flat safety glass lenses do not distort the vision, nor do they become steamed or fogged. This feature allows the wearer to speed-up his work and perform his duties more efficiently.

The Acme No. 4 Gas Mask provides the ultimate in protection against fumes resulting from fumigating gases.

The face piece is made from highest quality rubber assuring pliability and long life. No rivets, threads or adhesive taped pads to irritate the fumigator's face, or cause headache discomforts.

When ordering Acme Canisters, always specify type of gas or chemical being used.

Folder PM 387 describes Acme Gas Masks in detail — write for it, and prices.

ACME PROTECTION EQUIPMENT CO., INC.
Manufacturers of Respiratory Protective Devices
3605 Liberty Ave. Pittsburgh, Pa.

GREATER *Kills* with CERTOX
REG U. S. PAT. OFF.

Rodent Seed, Ant Jelly, Arsenic, Carbolic, Pyrethrum, Cresylic, Red Squill, Derris Powder, and other effective chemicals that do a thorough job for the Pest Controller. The quality of CERTOX products remains unaffected by the national emergency. Prices, too, are near normal.

YOUR GUARANTEE:

All CERTOX products are manufactured according to exacting specifications under personal supervision of I. H. LUTTAN, B. S. A., Entomologist.

SPECIAL CONTRACT PRICES Available to Cover your Annual Needs.

YORK CHEMICAL CO.
Suppliers of Complete Exterminating Chemicals.
424 West 18th Street, New York, N.Y.

Guarantees in Advertisements as Viewed by Federal Trade Commission

By I. W. DIGGES, *of the New York Bar*

EDITOR'S NOTE: *In view of the unqualified termite and mothproofing guarantees which are being handed out rather promiscuously by many PCOs, the article below, reprinted with kind permission of Printers' Ink, should prove of timely as well as material interest to the Industry. For your own good, careful study, of the legal opinions expressed, is urged.*

THIS discussion will by-pass the questions of whether or not an advertisement is an offer to sell and whether or not a guaranty stated in an advertisement is an express warranty. It will go directly to what appears to be a crystallized trend among Federal Trade Commission cases involving representations of guaranty, and examine the logic of that trend.

The Commission's decisions to which reference is made may be rationalized as follows:

1. The test of fairness in a statement of guaranty is what the average reader or listener has a right to believe from the wording of the guaranty and not what the manufacturer has in mind when he states it.

2. A guaranty, to be clearly stated, must evidence its exact scope.

3. A guaranty, to be fair to the public, must show the penalty which the advertiser expects to pay if the guaranty is breached.

With these principles stated, this article will probably be most helpful by applying them to specific statements of guarantees—all hypothetical.

First, there is the **unlimited** guaranty. Typical of it are the unqualified terms "Guaranteed" and "Fully Guaranteed." These do not clash with the Commission's attitude so long as the manufacturer places no limits on the reasons for which or the conditions under which they become operative and no limits on the penalty he is willing to pay.

Most manufacturers, however, are unwilling to assume unlimited risks and, therefore, usually fix, even though they do not publicly state them, some limits to the conditions under which their guaranty becomes operative and some limits to the terms or penalties they will pay.

The attitude of the Commission as disclosed by its rulings is that if limiting conditions and limiting terms do exist, they must be stated when reference to the guaranty is made.

When a guaranty is unlimited the manufacturer is expected to honor claims for failure of the purchased article to fulfil any performance claims which the reader might with reason have believed to be covered by the guaranty, for under the Commission's theory, a use of the unqualified term "Guaranteed" is a statement of an unlimited assurance, with the assumption of a corresponding unlimited obligation to the public.

Cost Plus Damages

If his guaranty is unlimited in its terms—penalties—he must pay not only to the extent of a refund of the price but also for attendant damages. Let us assume that a food product is so advertised. A purchaser, having made his purchase as a result of the advertisement, falls ill by virtue of an impurity or some foreign matter lodged in that particular package. Should the advertiser be asked only to refund the purchase price, or should the advertiser likewise be liable for the consequences which may flow from the purchaser's consumption of the deleterious food, including such things as medical treatment and compensation for loss of employment? The Commission appears to believe that the unqualified assurance leads the public to conceive of the guaranty as being as broad as to the word itself, and that the penalty to be incurred if the guaranty is called into play should be co-equal with the natural and proximate results which flow from the failure of the product to live up to its advertised virtues. Conversely stated, the Commission believes that unless an advertiser assumes that when he uses the single word "guaranteed" he is making an unlimited guaranty, and unless in fact he lives up to that precept in actual practice, he is guilty of deceptive advertising in violation of section five of the Federal Trade Commission Act.

In the twilight zone between wholly unlimited guarantees and definitely limited guarantees, there are numerous ones similar to those in present-day use which are limited as to some

INSURANCE
***FOR THE* PCO!**

BUYING PEST CONTROL INSURANCE, LIKE PERFORMING A FUMIGATION, HAS MANY HAZARDS, AND SHOULD ONLY BE ENTRUSTED TO THE EXPERT

In order to secure the kind of coverage that will protect you when it is most needed, we'd suggest that you avail yourself of the facilities of an organization (in business since 1915) that has pioneered in complete insurance protection for the Pest Control Industry; that has, and is, writing the largest volume of this type coverage in the U. S. . . . Our co-operation with the National, as well as local pest control associations, has brought about substantial underwriting benefits for the Industry. . . . Our policies are issued in American stock companies in all states.

- PUBLIC LIABILITY
- WORKMEN'S COMPENSATION
- FIVE YEAR TERMITE GUARANTEES
- AUTOMOTIVE AND ALLIED LINES

Full Protection Now Available Against War and Bombardment

MEMBER NATIONAL PEST CONTROL ASSOCIATION

Your Insurance Needs Analyzed Without Obligation, If You Will Write—

B. & D. A. WEISBURGER

1440 BROADWAY, NEW YORK

or all of the conditions and unlimited as to some or all.

There might be "Quality Guaranteed" window curtains. Here the conditions are definitely limited to the point that the guaranty is not operative if the curtains do meet quality standards. (However, "Quality" being a broad term, it is not an entirely satisfactory limiting condition for a guaranty.) But this guaranty is wholly unlimited in its terms. Assuming the customer can prove failure to meet quality standards, the manufacturer's penalty is not limited to the refund of money or replacement of the curtains, but includes remuneration for any consequences which may follow the purchase of curtains, such as loss of use during period required to exchange or purchase of new ones.

There is "five-year guaranty" as to a household appliance. This is limited only as to the time-period condition. Technically, a customer has a justifiable claim even after four years and 364 days of use on the simple statement that the appliance no longer works satisfactorily. And the manufacturer's penalty is not limited to refund of purchase price or furnishing a new appliance but he is liable for any consequences flowing from the use of the appliance such as bodily injury due to failure of the appliance to work satisfactorily.

Take also the case of a hypothetical protective agent covered by this guaranty — "Guaranteed to exceed Government specifications." The conditions of this guaranty are quite specific. The manufacturer is **not** necessarily liable if it doesn't last a reasonable length of time. He is not necessarily liable if the object to which it is applied deteriorates because it fails to last for a reasonable length of time. He is liable only if it fails to exceed Government specifications.

But if the customer proves that it does fail to exceed Government specifications, his penalty is wholly unlimited. He is liable for refund of its cost, for the cost of labor in using it and for deterioration of the object it was supposed to protect.

Numerous Federal Trade Commission proceedings have clearly outlined these things as the obligations of manufacturers when guaranties are stated in such fashion. To escape unlimited obligations and to escape possible Federal Trade Commission proceedings, manufacturers need keep in mind only one fact. Whenever and wherever reference is made to the guaranty, state in immediate conjunction with that reference **all** the conditions and **all** of the terms which are included in a formal statement of the guaranty or in actual practice underlie the administration of the guaranty.

Entomology and Warfare

"A young friend of mine, a keen student of insects, has recently been taken over by the military authorities as an entomologist. He does not know where he will be sent or did not when I talked with him, but he has a keen sense of the possibilities of such a position, and is very enthusiastic about it. Years ago, I met Sir David Bruce in Madeira, and he commented on the great opportunities for work connected with the transmission of disease in the tropics and the unwillingness or inability of most resident medical officers to take up this work, in addition to their regular duties. If our military authorities are now establishing entomological units, with trained workers, in all the places where our troops are stationed in the tropics, the results will certainly be of great importance. Sickness and death will be prevented, and information will be obtained which will be of value in times of peace."

—T. D. A. COCKERELL

—From Science, March 29, 1942.

One today is worth two tomorrows.—Quarles.

SOLVAY

TRADE MARK REG. U. S. PAT. OFF.

PARA-DICHLOROBENZENE

FOR

MOTHS

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SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured By The Solvay Process Company

40 RECTOR STREET NEW YORK, N. Y.

"THE QUALITY STANDARD"

ODORLESS

PYRETHRUM EXTRACTS

D & O Odorless Pyrethrum Extracts have been in commercial use only for eighteen months, but in that short time have established themselves as superior in purity, uniformity, clarity, freedom from odor and in effectiveness.

The resultant volume of demand would have been difficult to cope with under any conditions and impossible under present handicaps. We can only express our sincere regret at our inability to accept all orders and our hope that we can accept a larger proportion soon.

DODGE & OLCOTT COMPANY

180 VARICK STREET · NEW YORK, N.Y.

BOSTON · CHICAGO · PHILADELPHIA · ST. LOUIS · LOS ANGELES

Plant and Laboratories: Bayonne, N. J.

LOCAL ORGANIZATION NEWS

New England Pest Control Association

At the open meeting of the N.E.P.C.A. which attracted an attendance of thirty, several from out of town, on May 26, at the Hotel Lenox, Boston, Miss Marie Fortunati, M.E.D., C.P.H., Health Educator of the Department of Health, City of Boston, spoke on the public educational campaign on sanitation that she has been conducting in the most densely populated section of Boston, if not in the U. S.

The N.E.P.C.A. voted to purchase a $100 War Bond out of its treasury funds. It also voted a resolution to be sent to the State Rationing Board pledging that all their members would do everything possible to conserve tires and gasoline; that routes were being cut to a minimum; and that conservation would be their key-note at all times.

Bart Eldredge rendered a report on the status of the N.P.C.A.'s War Program, which was followed by a report from Mr. Corey, and one by George Elliott on his trip to Washington.

The following two new members were voted into the Association: Acme Exterminating Co., 88 Tremont Street, Boston, L. C. Duntlin; Sanitary Exterminating Inc., 465 Commonwealth Avenue, Boston, L. H. Fairbanks.

Among those present were: Bartlet W. Eldredge, Waltham Chemical Co.; A. Corey, Waltham Chemical Co.; A. Bain, New England Ext. & Fum. Co., Lowell; F. Kaplan, New England Ext. & Fum. Co., Lowell; Charles W. Houghton, Safety Fumigant Co.; Robert J. Pelletier, Ideal Spray Co., Lynnfield; Earl Myers, New England Ext. Co., Brookline; Kenneth Cook, Ransford Insecticide Co., Worcester; George R. Eliott, Ransford Insecticide Co., Worcester; Louis Rich, George B. Delue Co.; J. Newman, Holyoke; Lester West, Rose Exterminating Co.; C. A. Chafe, Quincy; Harry D. Lockhart, Hyde Park; C. E. Burkett, Roslindale; Maillard, Maillard Vermin Ext. Co., Springfield; Mr. Sargent, Sargent Ext. Co., Worcester; Mr. Ford, Griggs & Brown, Worcester.

Report submitted by Acting Secretary B. W. Eldredge.

St. Louis PCOs Meet

The June meeting of the St. Louis Pest Control Operators Association was held at the York Hotel on the evening of June 9th. The men met for dinner at 6:15 p.m. and the meeting was called to order at 8:20 p.m.

The meeting of the American Public Health Officials which will be held this year in St. Louis, was discussed; also reports were made on itinerant operators in the St. Louis area.

A special letter will be sent out by the secretary, Mr. Emil Ganter, to all firms in our industry urging them to become members of the National Association.

Unusual Fumigation Problem

A Pest Control Operator was recently called upon to fumigate a home which had an open well in the cellar. He knew that hydrocyanic acid was very soluble in water and he figured that this would present two undesirable factors, namely, No. 1—the amount of gas absorbed by the water would take just that much away from the fumigation and, No. 2—what might be the effect upon persons drinking the water.

If the gas came in actual contact with the water there would, of course, be a certain amount of surface absorption since hydrocyanic acid is soluble in water. However, he effectively solved the problem by covering the well hole with a heavy tarpaulin and sealed it as carefully as possible. In addition, right after the place had been thoroughly aired out, he placed a fan at the opening of the well aiming down so as to blow out any slight amount of gas which might have entered.

—Discoid News Bulletin.

Cooperation

Cooperation would solve most of our problems. For instance, freckles would be a nice coat of tan if they would get together.

—Kalends, April 1942.

"With the Colors"

Robert R. Heaton, graduate of Purdue University and for a number of years manager of the Indiana Terminex Company at Indianapolis, has been inducted into the Army Sanitary Corps as First Lieutenant. He reported for duty June 19. During his absence Mrs. Heaton will take over the duties of office manager and J. H. Beck as outside manager.

Dr. Edward C. Elliott, president of Purdue University and "patron saint" of the pest control industry, has been granted leave to fill an important post in Washington as Coordinator of Civilian War Training in the Colleges of the Nation.

JACK YARO, owner-operator of the Presto Exterminating Company of New York City, has been in the Army since April 15th and latest word tells us that he is at Fort McClellan in Alabama.

Enthusiasm is the fruit of sincerity.

Brush Catalog!

We show the most complete line of brushes in the U. S., including floor brushes and miscellaneous items for the janitor trade. Ask for your copy of this big catalog today.

FLOUR CITY BRUSH CO.
MINNEAPOLIS MINNESOTA

PACIFIC COAST BRUSH CO.
LOS ANGELES CALIFORNIA

Phosphorus Paste
10 lbs., $4.25; 25 lbs., $9.
50 lbs., $17; 100 lbs., $32.50.
For the extermination of rats and roaches.

Bird Repellent
10 lbs., $6; 25 lbs., $13.50.
50 lbs., $25; 100 lbs., $45.
Keep buildings free of roosting birds.

PEST CONTROL CHEMICALS CO.
P. O. Box 37 *Write for Details* BUFFALO, N. Y.

"GOOD" DISINFECTANTS
Pine Oil Disinfectants Coefs. 3 and 4
Phenolic Emulsifying Disinfectants Coefs. 2 to 20
Soluble Cresylic Disinfectant
Coef. 2.5 (B.A.I. Specifications)
Saponated Solution of Cresol
U.S.P. XI (Cresol Compound Solution)
All made under careful laboratory control. Phenol coefficients determined by LaWall and Harrisson Laboratories.

OTHER "GOOD" PRODUCTS

Insect Sprays	Vegetable Oil Soaps
Cattle Sprays	Liquid Soaps
Bed Bug Sprays	Scrub Soaps (Liquid & Jelly)
Agricultural Insecticides	Floor Wax and Polishes

BULK PACKAGES AND PRIVATE LABEL

JAMES GOOD, INC.
Manufacturing Chemists—Since 1868
2121 E. SUSQUEHANNA AVE. PHILADELPHIA, PA.

WHAT'S NEW IN PEST CONTROL-PERSONALS

DR. L. A. HAWKINS RETIRES: The U. S. Department of Agriculture announced today the retirement of Dr. L. A. Hawkins, veteran of 35 years service in the Department. He has been in charge of the Division of Control Investigations in the Bureau of Entomology and Plant Quarantine since this division was started.

C. P. Clausen, head of the Division of Foreign Insect Parasite Introduction, will take charge of the work of the Division of Control Investigations in addition to his parasite work until more permanent arrangements are made for the administration of this activity.

PROF. J. J. DAVIS has been ill for several weeks during part of which time he was hospitalized. While there he also suffered an attack of hiccups for seven days and nights. Latest word happily indicates he is on the mend; and we extend to him our well wishes for a speedy return to complete good health.

WALTER E. DOVE NAMED USDA DIVISION CHIEF

The U. S. Department of Agriculture announced today the appointment of Dr. Walter E. Dove as chief of the Division of Insects Affecting Man and Animals, (Bureau of Entomology and Plant Quarantine) in the absence of Emory C. Cushing, who has joined the military services as Major, Sanitary Corps, U. S. Army.

A new building material for wall construction has a weather-sealed mineral granule surface on a cane fiber insulating board core. The core is treated for protection against termites and dry rot and is coated on all sides with an asphalt compound. It has high insulating value and allows quick, easy erection.

—Nation's Business.

Man or Mouse Club: Latest promotional venture to stick its nose about the horizon is the Man or Mouse Club, which John L. Chaney of Springfield, O., has organized to simplify the solution of trifling problems. The key is a "man or mouse decider," which the member flips to decide how to act in trifling matters, without wasting time or effort.

We're still getting over our illuminating experience when we bought a morning newspaper announcing the fall of Bataan. "This is bad," we said to the news-stand operator as we looked at the headlines. "Yuh," said the newsie, "who owned it, the British?"

The American Section of the Society of Chemical Industry announces the election of the following officers for the year 1942-1943:

Chairman.....Dr. Foster D. Snell
Vice Chairman.....Dr. Norman A. Shepard
Honorary Secretary.....Mr. Cyril S. Kimball
Honorary Treasurer.....Mr. J. W. H. Randall

The following new Committee members were elected to take the place of retiring members:

Mr. Edward R. Allen
Mr. Francis J. Curtis
Dr. Donald Price
Mr. Archie J. Weith
Dr. Lincoln T. Work

A Danish paper, in covering a British bombing of a German munitions plant, was ordered to state in their account that "only a cow was hit." The Danish editor (just before the paper was suspended, incidentally) added these words of his own, "And the cow burned for four days." . . .

It's a Boy at the Kleins: "Robert E." made his bow on June 8. His daddy, Mr. D. Klein, operates the Allied Exterminating Co., N. Y. Congratulations to Mr. and Mrs. Klein and the best of good wishes to "Robert E.".

Two "Musts"

Buy War Bonds! Plan to attend the Tenth Annual N.P.C.A. Convention at Pittsburgh, October 26, 27, 28.

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A PURE PYRETHRUM PRODUCT CONTAINING .5% PYRETHRINS

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Its great penetrating power makes your work easier and gives added assurance of success. • Your fumigation for insects automatically takes care of rodents, driving them out of their retreats to die on the open floor, without carcass nuisance. • For rodents, alone, only light dosage is needed, a pint or even less for each 7000 cubic feet. • Larvacide's inseparable self warning quality cuts accident risk. • Write for literature on More Profitable Industrial & Home Fumigation.

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has long been used in Flour Mills, Grain Elevators, Storage Warehouses and Food Plants. Comes in cylinders 25-180 lbs. and 1 lb. bottles (so convenient for small jobs) each in safety can, 6 or 12 to wooden case. Stocked in cities conveniently near you.

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28th Semi-Annual Meeting of National Association of Insecticide and Disinfectant Manufacturers, Inc.

Need for Continuance of Adequate Pest Control Under War-Time Conditions Stressed by Major Joel I. Connolly

As expected, talks emanating out of war circumstances spotlighted the two-day mid-year meeting of the N.A.I.D.M. held June 8 and 9, at the Edgewater Beach Hotel, Chicago.

Talks and papers on the program, of specific or related interest to the PCO, were: "What Can the Industry Do to Help Preserve Health in Congested City Areas Under War-Time Conditions," in which Major Joel I. Connolly, Health Department, City of Chicago, re-emphasized the vital necessity to maintain adequate pest control service, particularly in the war interim; "The Use of Insecticides and Disinfectants in the Home," Mrs. Ruth Crowley, Columnist, Women's Page, Chicago Sun "The Use of Insecticides and Disinfectants in Our War Program," P. A. Surgeon, Dr. John E. Dunn, U. S. Public Health Service, Washington, D. C.; "The Public Health Aspect of Household Insecticides and Disinfectants," H. C. Fuller, N.A.I.D.M. Consultants, Washington, D. C.; RAW MATERIALS SYMPOSIUM—"Pyrethrum and Rotenone," Dr. Alfred Weed, John Powell & Co.; "Coal Tar Raw Materials," J. H. Carpenter, Koppers Co.; "Pine Oil," Frank Rapp, Hercules Powder Co.; "Synthetic Toxics for Insect Sprays," Ira P. MacNair, MacNair Dorland Co., Inc.; "Questions on Price Ceilings as They Affect Insecticides and Disinfectants," Dr. Paul Poirot, Office of Price Administration, Baltimore, Md.; "The Proposed Industry Committee for the Insecticide Industry," Melvin Goldberg, Inorganics Section, Chemicals and Allied Products Branch, War Production Board, Washington, D. C.

Both the program of social events and convention attendance were excellent.

Hints to Motorists on How to Stretch Gasoline Rations

Drive less and walk more. Cut out pleasure driving and concentrate on essential driving.

Fill up the empty seats in your car. Form a car club; pool essential driving with your neighbors; take turns at driving the crowd to the office or factory; make shopping day a neighborhood enterprise, with five or six people to each car.

Drive slowly. Your gasoline will take you farther if you drive under 40. Every mile you knock off your speed means a saving in gas.

Cut out jackrabbit starts and stops—they waste gasoline. Make sure your tires are properly inflated; it takes more gasoline to drive a car with underinflated tires.

Use lighter oils. Heavy oil drags on your engine, and more gasoline is needed to overcome this drag.

Use first and second gear as little as possible. Accelerate slowly, but shift to high at 15 miles an hour.

Have a slipping clutch adjusted at once.

Go easy on your hand choke. Improper choking floods the engine with too much gasoline. Driving with the choke out also wastes gasoline.

Make these checks every 5,000 miles or oftener: Have the spark plugs cleaned and adjusted. Have the distributor points checked and adjusted. Clean the air cleaner. Have the carburetor cleaned and adjusted.

Park in the shade whenever you can. Gasoline evaporates more quickly from your tank in the hot sun.

Rat Bites Boy in Street

TEANECK, N. J.—Robert Point, five-year-old son of Mr. and Mrs. Edward A. Point, of 255 Lindberg Road, was bitten severely on the right arm recently by a rat while he was playing in the street near his home. He was taken to Holy Name Hospital, where he received injections against rabies and remained for observation.

—Herald Tribune.

BACKSTROKE

In Willians Field, Ariz., hospital attendants applied an eight-inch-square bandage to the posterior of Private John Fain, who had killed a fly with a razor while he was shaving in the nude.

—Time.

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No agent is authorized to solicit renewal subscriptions to Pests! Subscriptions placed in that manner will not be honored by us! If you wish to renew your subscription to Pests, please send such renewal direct to us.

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Write today to the Wood Treating Chemicals Co., 1884 Arcade Bldg., St. Louis, Mo., for full facts and prices on this amazingly powerful, scientific formula - - - **TERRATOX.** It's a **9-for-1** concentrate. Easy to use. Inexpensive. Long lasting. Practically insoluble in water. Employs National Pest Control Association's "one, two, three, three and one-half steps" technique. A real killing combination of Monsanto's chemicals. Write now. Find out how you can save work and make money with **TERRATOX.**

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Entomological Literature

SOME NEW OR LITTLE-USED INSECTICIDES WORTHY OF FURTHER TESTING

By R. C. Roark, Division of Insecticide Investigations, U. S. Dept. of Agriculture, Bureau of Entomology and Plant Quarantine, Washington, D.C., April, 1942.—E-564.

Part 1. Copper-Arsenic Compounds' — Compounds Related to Paris Green—Compounds Made with Sulfurized Organic Acids.

THE HOUSE FLY AS A VECTOR OF FOOD POISONING ORGANISMS IN FOOD PRODUCING ESTABLISHMENTS

The paper above titled was prepared by Morris Ostrolenk and Henry Welch, Ph.D., F.A.P.H.A.—U. S. Food and Drug Administration, Federal Security Agency, Division of Bacteriology, Washington, D.C.; read at a Joint Session of the Engineering and Food and Nutrition Sections of the American Public Health Association at the Seventieth Annual Meeting in Atlantic City, N. J., October 15, 1941; and published in the May-1942 issue of American Journal of Public Health.

The experimental work included: Transfer of Salmonella Enteritidis from Flies to Flies; Longevity of Salmonella Enteritidis in Flies; Transmission of Salmonella Enteritidis from Flies to Mice and from Mice to Flies; Survival of Salmonella Enteritidis during Metamorphosis of House Fly.

SUMMARY—CONCLUSIONS: Flies fed on food infected with Salmonella enteritidis are capable of infecting other flies as well as the food, water, and miscellaneous surfaces with which they come into contact.

Salmonella enteritidis apparently survives in the fly for the duration of the life of the fly, approximately 4 weeks.

Transfer of Salmonella enteritidis infection from infected flies to mice and the retransfer of infection from infected mice to flies was successfully carried out.

Fly eggs planted in mash infected with Salmonella enteritidis resulted in infected maggots, pupae, and adults.

A REVIEW OF METHODS FOR THE CHEMICAL ANALYSIS OF ROTENONE-BEARING PLANTS

By Howard A. Jones, Division of Insecticide Investigation, U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine, April, 1942.—E-563.

CONTENTS COVER: Sampling, moisture, total extract, Rotenone, Deguelin and rotenone plus deguelin, toxicarol and other alkali-soluble substances, miscellaneous colorimetric determinations, other determinations, etc.

Device Measures Insecticide Toxicity

Special testing devices have been constructed by various manufacturers and college stations to determine insecticide toxicity. The latest toximeter has been developed by the New Hampshire Experiment Station, for the study of contact insecticides. In the spray testing cabinet constructed by the University of New Hampshire, variables in the study of relative toxicity of various chemical contact insecticides have been largely eliminated. Their toximeter consists of a cabinet. It makes possible the avoidance of stray air currents during the period while atomized liquids are being applied. It enables the experimenter to evacuate spray mists immediately after an application.

—American Miller, April 1942.

Mosquitoes vs. Human Sleeping Sickness

Mosquitos — carriers of malaria, yellow fever, dengue and many other maladies of man and animals—have been proved one of the transmitting agents responsible for the spread of encephalitis (sleeping sickness of man) and encaphalomyelitis (sleeping sickness of horses).

—Can. Entomologist, April 1942.

To escape criticism: Say nothing; Do nothing; Be nothing.

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Please note, however, that you must request each booklet on a separate letterhead though they may all be mailed in one envelope addressed to Pests, 126 Lexington Avenue, New York City, N. Y.

ANTIDOTE KITS

With the increased use of certain poisons in the control of predatory animals, rodents, and insects, more and more accidental poison cases are bound to occur. Studies of these poisons have led to the development, for each poison, of an antidote which is, we understand, in itself, harmless, but may be effective in the hands of a layman rendering first aid to a poisoned person or animal, before the services of a doctor can be secured. Antidotes conveniently packed for kit use are now available for the following poisons: Barium Carbonate Antidote, for human or animal; Phosphorous Antidote, for human or animal; Thallium Antidote, for human or animal; Arsenic Antidote, for human or animal; Strychnine Antidote, for human; Strychnine Antidote, for dog; Strychnine Antidote, for horse; Fluoride and Fluosilicate, for human. Literature giving fuller particulars and prices on request.

WRITE PESTS—Jayne.

CHLORPICRIN

36 page illustrated brochure which discusses Chlorpicrin uses, advantages, safety, effectiveness, properties, methods of application, equipment, general fumigation, the sealing of the building, temperatures in fumigation, dosages in general fumigation, exposure, grain elevators, box car fumigation, rats and mice, comfort and safety of operator, controlling insect infestation, dosage schedule, etc.

WRITE PESTS—Chlorpicrin.

GAS MASKS

Literature descriptive of gas masks of interest to fumigators. Manufacturer indicates masks are full visioned, affording wearer unobstructed vision, making for greater safety.

WRITE PESTS—Folder M387

NEW INSECTICIDE CONCENTRATE FOR CONTACT SPRAYS:

Bulletin describes concentrate, which is a derivative of the southern pine, which assures a dependable supply, and which is the thiocyanoacetate of a secondary terpene alcohol. It also gives results of the Peet-Grady tests of "Thanite" sprays in comparison with the official test insecticide. Laboratory and field tests, the bulletin further states, established that the material has knockdown and killing properties against flies, bedbugs, mosquitoes, roaches, moths, ants, mites, silver fish, centipedes, and spiders, and repellent properties in livestock sprays.

WRITE PESTS—"Thanite".

PYRETHRUM EXTRACT No. 20

Circular discusses pyrethrin content, kill and knockdown value, odor, color, clarity, stability, price and other concentrates for liquid insecticides.

WRITE PESTS—Dodge.

THALLIUM SULPHATE

Interesting data which discusses Control of Rodents with Thallium Sulphate—with suggested formula; Control of Ants with Thallium Sulphate with suggested formula with additional information on Thallium Sulphate as a rodent poison.

YOUR FREE COPY MAY BE HAD BY ADDRESSING ORE c/o PESTS.

INSECT DISPLAYS

Circular describing realistic full size insect displays. Useful in developing consumer contacts.

WRITE PESTS—ABT.

Success

Original, Ruby Moragne, Okla.

It's keeping humble yet thinking high
Your feet on the earth, eyes on the sky.
It's doing your duty day by day.
It's going quietly on your way.

It's keeping your head when the world's aflame
With madness of war and greed for gain.
It's wanting to live yet daring to die.
It's being afraid to tell a lie.

It's helping your neighbor when in need.
It's refusing to stoop to a crooked deed.
It's forgiving, helping, and loving, too.
It's planning, toiling, t'ward an end you view.

It's a lot of labor, a little mirth.
It's making better this sad, old earth.
It's keeping cheerful though dark the sky.
It's smiling on when you want to cry.
It's lab'ring upward though stern the stress.
It's living your noblest, THAT'S SUCCESS.

Dragonflies, equipped with exceptionally superior wings, can fly 60 miles per hour.

—*Science News Letter.*

Business Opportunities

(Classified)

RATES — For individuals seeking employment, 5c per word, minimum $1.00. All others 10c per word, minimum, $2.00. All advertisments must be in the hands of the publishers seven days before publication date and must be accompanied by cash or money order for payment in full. The publishers are not responsible for any false or misleading advertisments.

Replies to advertisements where box number only is indicated should be addressed c/o Pests, 512 E. 14th St., Kansas City, Mo., giving box number as well.

PARTNER WANTED — Established extermination business with retail store in Pennsylvania. Starting wholesale department. Address B 22 c/o PESTS.

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Now that woolen conservation is so vital to "UNCLE SAM'S" war program, there is still greater need for Moth protection. You can help "America" protect its valuable woolen materials by selling "PER-MO" Mothproofing Service. Full particulars and prices first letter.

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A NEW 100% DOMESTIC TOXIC AGENT FOR FLY SPRAYS

AT THIS TIME, when foreign supplies of insecticide raw materials are drastically curtailed by lack of ships, Hercules is proud to announce a new 100% domestic chemical concentrate, Thanite*, which suggests a way out of the imminent dangers to public health and to agriculture. Thanite is a complete active ingredient — combining superior knockdown, high killing power, good repellency. Thanite is both effective and economical.

LOOK AT THESE FIGURES:

% OF THANITE	TYPE OF SPRAY
1.75	Grade B
2.00	Grade A
2.5	Grade AA

Thanite is equally effective in heavy base oils for cattle sprays. Send for complete details.

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QUICK FACTS

100% active, with a definite chemical composition, Thanite is produced under rigid chemical and biological control.

Thanite is safe, non-corrosive, non-staining, adds only a slight odor, as used in sprays.

Completely effective against a wide variety of insects, Thanite sprays combine high knockdown, kill, and repellency.

No container problem or manufacturing difficulties are encountered, since Thanite sprays are stable, even to light in flint glass bottles.

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However,

MORTICIDE

can be used today by all Pest Control Operators at no change in price. You are therefore assured of a highly efficient insecticide for bedbugs at the same price as before.

MORTICIDE has been used by Pest Control Operators in practically every state, and the steady increase of users attests to its efficiency and killing power.

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